DECEMBER
1960
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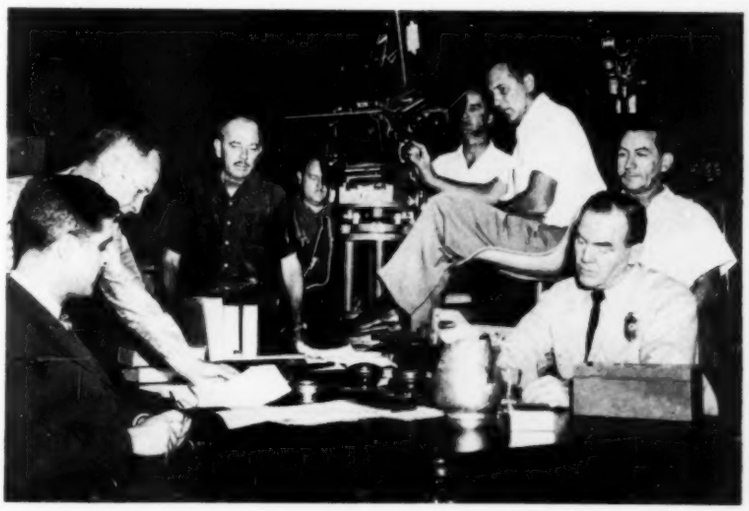
35¢

AMERICAN Cinematographer

The Magazine of Motion Picture Photography

Cinematography For Television Films

Page 734



Coaching Basketball With Movies

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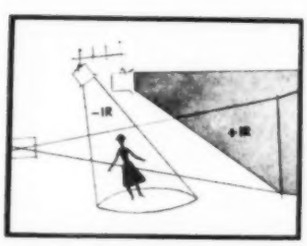
Filming The Behavior of Hookworms

Photography That Advances The Story



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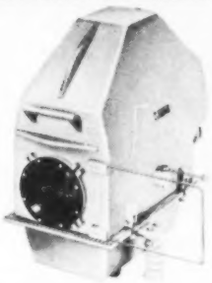

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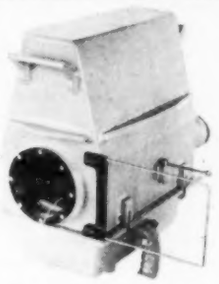

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Editorial and Business Office: 1782 North Orange Drive, Hollywood 28, Calif.
Telephone: HOllywood 7-2135

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ON THE COVER

A montage of photos illustrating the subjects of several important articles to be found in this issue.

AMERICAN CINEMATOGRAPHER, established 1920, is published monthly by the A. S. C. Agency, Inc., 1782 N. Orange Dr., Hollywood 28, Calif. SUBSCRIPTION: United States and Canada, $4.00 per year; Foreign, including Pan-American Union, $5.00 per year. Single copies 35 cents; back numbers 45 cents; foreign single copies. 45 cents; back numbers, 55 cents. Advertising rates on application. Copyright 1960 by A. S. C. Agency, Inc. Second-class postage paid at Los Angeles, California.

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FOUNDED January 8, 1919, the ASC was established to advance the art and the science of cinematography; to encourage, foster, and strive for preeminence, excellence, artistic perfection and scientific knowledge in all matters pertaining to cinematography; to bring into closest confederation those leaders in the cinematographic science whose achievements in that field entitle them to membership in the Society; and to promote the interests of all who shall be called to membership in the ASC, that such membership may become a mark of honor and distinction based on merit.

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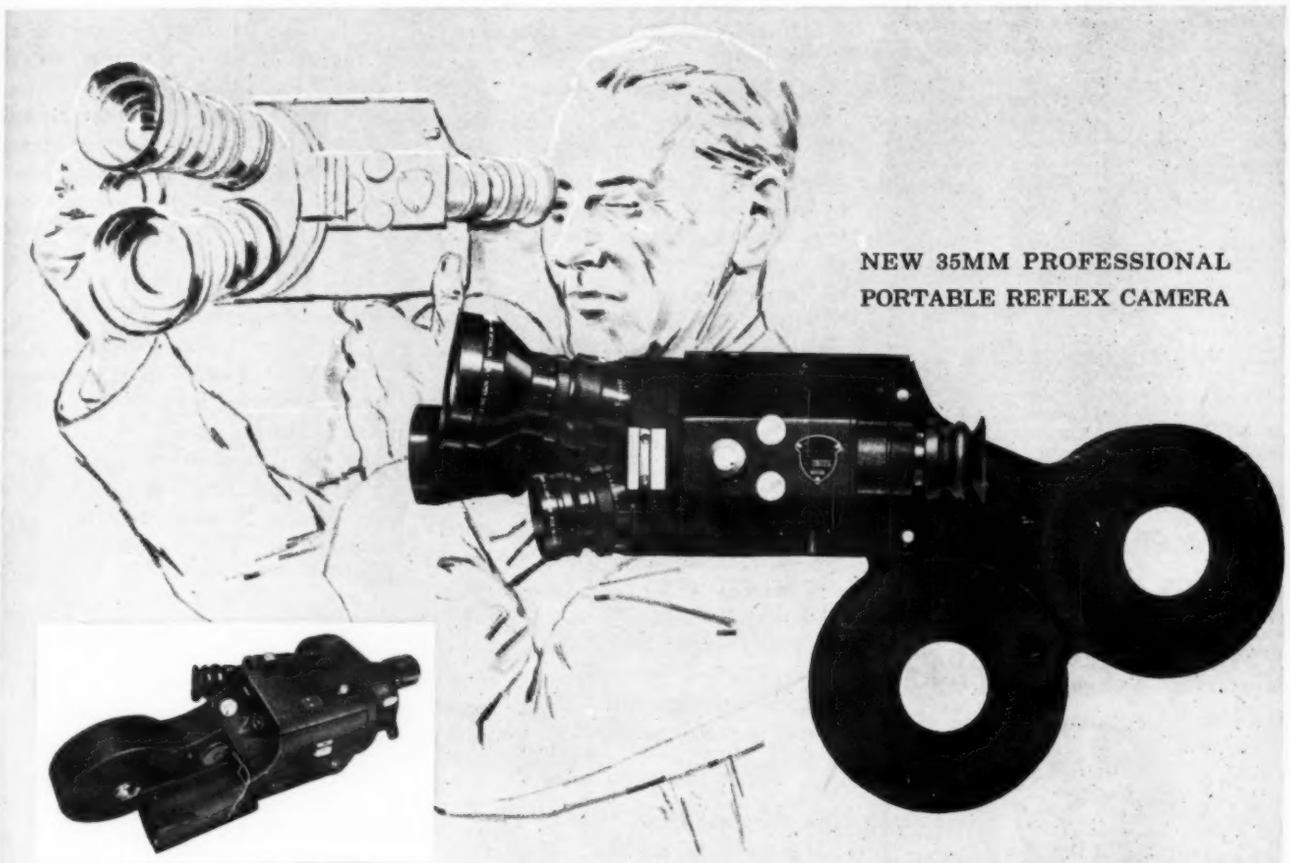

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INDUSTRY NEWS

News briefs of industry activities, products and progress

Hollywood Filming Zooms!

Production of both theatre and television films by Hollywood studios continues its upward trend, which took a definite turn in mid-summer.

Four Star Television set an all-time TV film production record last month by scheduling 16 half-hour and 5 hour-long segments for 13 different series to get underway at Republic Studios before December 1st.

Mid November saw a total of 33 feature films in production by Hollywood major studios and independents, 60% of which were shooting in the U.S. With 8 major productions before the cameras November 15th, 20th Century-Fox studio achieved a production peak for the year. Of the eight, four were shooting here, and the other four abroad.

On November 25th, *The Hollywood Reporter*, industry trade paper, reported that TV film production in Hollywood set a new high for number of series, with 114 shooting, not counting the late starters not yet announced.

Columbia Pictures' studio activity last month reached a new production peak for the year with a total of five features before the cameras. The studio's video film subsidiary, Screen Gems, was also at peak production.

* * *

The 70mm Trend

The current boxoffice "blockbusters" —*Spartacus*, *The Alamo*, and others— have started film laboratories tooling up for what looks to be a definite trend in production in 70mm film.

DeLuxe labs, a subsidiary of 20th Century-Fox is reported already setting up the necessary equipment for the super-widescreen width.

MGM is seriously considering expanding its film laboratory to accommodate 70mm processing and printing.

Technicolor, of course, long has been set up for lab services in the 70mm width. Most of the other independent laboratories are watching the trend closely, meantime doing some sharp figuring.

"Cost of re-tooling," reports *Daily Variety*, Hollywood trade paper, "depends on a number of factors peculiar to each lab, but price tag on facilities to make release prints is in the area of a half-million dollars. Added facilities to handle special processing, such as dailies, would be generally a quarter-million dollars. Thus . . . any lab must think in terms of a capital outlay of from $500,000 to $750,000 or more."

While the number of 70mm-equipped theatres in the country is estimated at less than 1% of the total number at present, other theatres are converting at the rate of one or two per month, it is reported.

* * *

Mellor Re-pacted by T-C-F.

Two-time Academy Award winner William C. Mellor, now directing the photography of Jerry Wald's "Wild In The Country," has been signed to a new one-year contract by 20th Century-Fox Studios. His next assignment will be George Stevens' forthcoming production of "The Greatest Story Ever Told."

* * *

Maps For Location Shooting

Large scale maps with the shooting sites designated by key lettering were supplied last month to production personnel for the location shooting in Northern California for Warner Brothers' "Susan Slade," according to Lucien Ballard, ASC, who is directing the photography of the picture. Because of the many location sites involved, the maps, prepared under direction of Director Delmer Daves, will enable personnel to quickly find the various sites where filming is scheduled.

* * *

DuPont Moves N.Y. Office

DuPont's Photo Products Department is transferring its New York district sales office and warehouse facilities to 248 West 18th St., Secaucus, New Jersey. Move is aimed to provide faster service to customers on east coast. Meantime, company is erecting a new building on a 20-acre site off the New Jersey Turnpike, which it plans to occupy about the middle of 1961.

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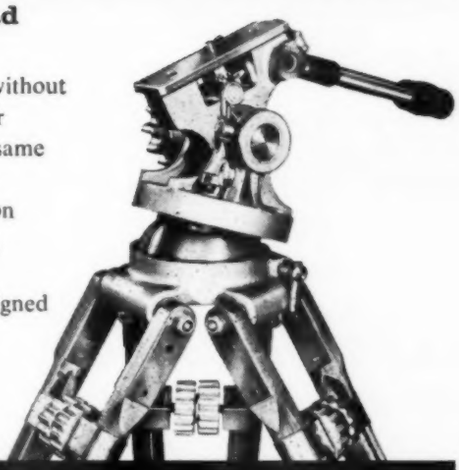

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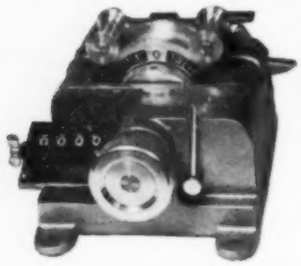

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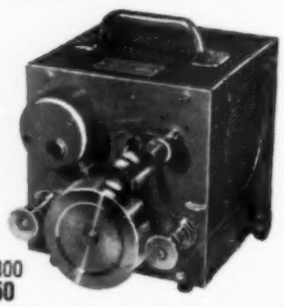

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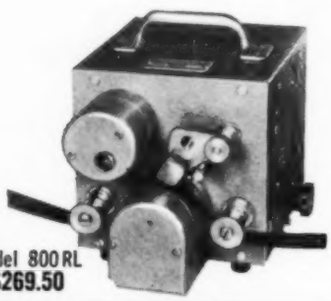

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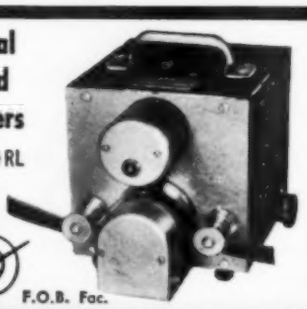

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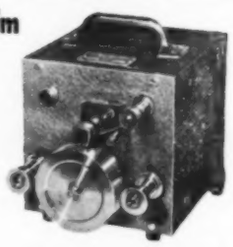

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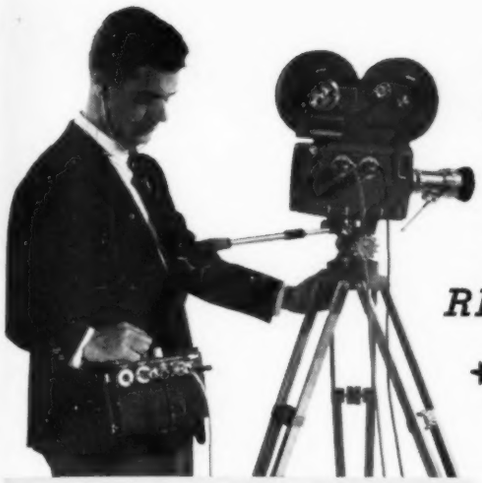

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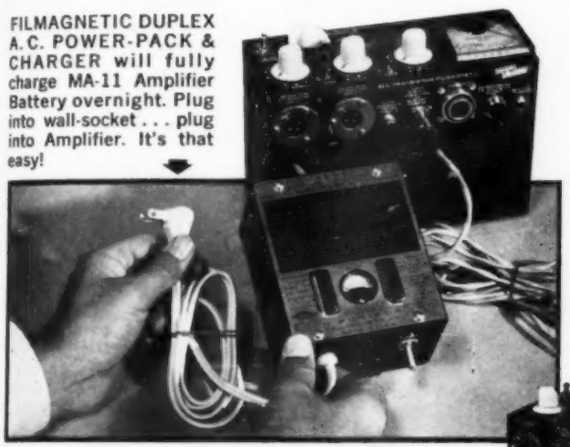

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WALTER STRENGE'S

QUESTIONS & ANSWERS

Need advice on a picture making problem? Your questions are invited and will be answered by mail. Questions and answers considered of general interest will appear in this column each month.

Q Can the factor established for a given filter be relied upon to apply under all light conditions? For example: when the sky is cloudy and a filter is used to improve rendition of trees, foliage or even faces?—*A. D. McC.*

Answer: The amount that exposure must be increased, when a correction or contrast filter is used, is determined by the multiplying factor established for the filter. This factor is governed by 1) the photographic material used and 2) the light source. Thus, when a filter is used outdoors, regardless of whether the sky is clear or cloudy, the factor established for use of that filter in sunlight will apply.

Filter factors specified by a film manufacturer for its respective negative and positive stocks can be relied upon for accurate results. In practice, the normal exposure time (for photography without filter) is multiplied by the filter factor and the lens diaphragm set accordingly.

Now in situations where quality of illumination may be different than that on which the filter factor has been computed, a different factor will apply. To determine the correct factor in such a case, it is advisable to shoot a test, or series of tests, utilizing a neutral test or grey-scale card for the exposure.

Generally speaking, if the factor specified by the film manufacturer is used and the film corectly exposed, any filter used will render its own color lighter and its complimentary color darker. Thus a yellow filter would record yellows lighter or wash them out completely, and record blues darker.

Q What is the simplest and most practical method of producing day-for-night shots in black-and-white photography?—*J. J. O.*

Answer: The illusion of night in B&W photography is best produced by a combination of contrast filters and underexposure. The position of the sun with relation to subjects in the scene is an important factor, too.

Since the sky is bright by day and dark by night, it is the principal area in the scene requiring correction. For this, use any of the yellow-orange or red filters, such as Wratten 21, 23A, 25, 29 or their equivalents. An effective combination is a 23A plus the green 56.

It is important to remember that only a clear blue sky can be filtered down for a realistic night effect; no amount of filtering will produce the same results when strong haze or overcast exists.

Underexposure, in addition to use of filters, should range between 1½ and 2 stops. Where the sky is not sufficiently blue to produce the desired effect with filters, it is advisable to eliminate the sky from the scene entirely by changing the camera angle.

Q I have experienced difficulty in producing satisfactory traveling mattes for live action. One method I have tried is frame-by-frame projection of scenes from a fine-grain dupe, using a Bell & Howell Standard camera with auxiliary shutter, then making tracings on animation paper. Cels were then overlaid on the tracings and matte paintings made which were in turn photographed on high-contrast film stock. This method proved too costly and resulted in considerable movement between the mattes and the live action.

In another method, I made a series of frame enlargements, then had the lab paint the underside black and shoot mattes. But this method produced annoying image movement, too. I use an Oxberry printer equipped with an Acme camera.—*L. C. D.*

Answer: This type of work requires the utmost precision in every step of the way. Your problem seems to be that there is too much margin for matte line error in both of the methods you use. Satisfactory results can be obtained with the first method described if extreme accuracy is used in tracing the iamges and where the matte is painted directly on the tracing with great care, thus eliminating the need for using the extra cel.

We recommend for study the article "Special Photographic Effects In Motion Pictures," which appeared in our October, 1957, issue, and of which reprints are available at 25¢ per copy. Other articles of interest on this subject appeared in our November, 1960, issue (pages 668 and 670).

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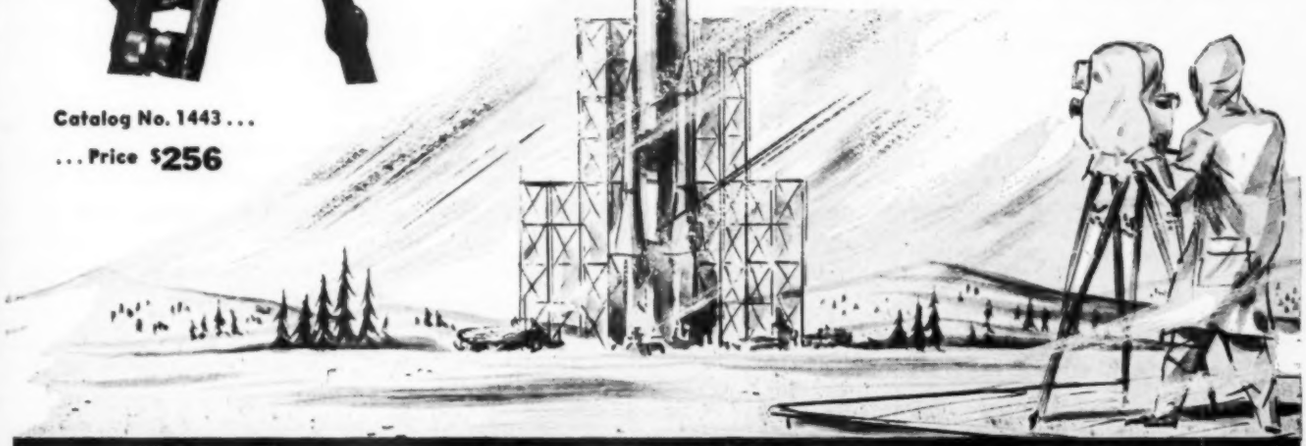

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NEW BOOK REPORTS

American Cinematographer Manual, *compiled and edited by Joseph V. Mascelli. American Society of Cinematographers, 1782 No. Orange Drive, Hollywood 28, Calif. $7.50.*

Publishing a handbook of facts and formulas relating to professional cinematography was a logical undertaking for the American Society of Cinematographers, which represents some of the finest achievements in cinematography as well as having in its membership some of the most erudite and progressive motion picture cameramen in the industry. From such a background an authentic and reliable manual of facts and workaday information for cameramen was a logical development.

It is the authenticity of the information contained in this 484-page book that sets it apart from others of its kind, which have been published to date. All of the charts and tables have been specially prepared; nothing has been "lifted" or reprinted from previously-published handbooks or instruction manuals.

In the research, preparation and editing of the Manual, editor Mascelli not only had the assistance of veteran Directors of Photography Arthur C. Miller and Walter Strenge, but also of members of the recently-liquidated Motion Picture Research Council of Hollywood — all of whom contributed to the book's volumnous data or checked on its authenticity to insure complete infallibility.

Included in the Manual are all the important charts and tables for filters, filter factors, camera speed compensation, depth of field, etc., plus data on exposure, professional motion picture cameras, lighting equipment, lighting ratios, background process and many others which limited space prevents enumerating here.

Suffice to say the Manual is a "must" for very professional cinematographer, regardless of the field in which he works. For it can provide instant answers to almost any motion picture photographic problem.

Marilyn Monroe, *by Maurice Zolotow. Harcourt, Brace and Company, 750 Third Ave., New York 17, N.Y. $5.75.*

This biography of one of Hollywood's most controversial actresses is of interest to anyone and everyone who has anything to do with Hollywood's motion picture industry, or whose ambitions point in that direction. First, because author Zolotow has provided such an entertaining account of how a typically introverted plain jane with an inbred desire to be an actress ultimately skyrocketed to fame; and second because the author has boldly raised the curtains to reveal typical daily goings-on within major studios, and particularly the personalities and whims of major studio personalities. More than once the part played by Directors of Photography, particularly those assigned to photograph Miss Monroe, are interestingly related.

"Marilyn also got the right to name her own cinematographer," Zolotow relates. "Among those listed in her contract as acceptable were Harry Stradling, Hal Rossen, James Wong Howe, and Milton Krasner" (all members of the ASC.—Ed.)

Again: "An extreme conception of the film as a director's art holds that the director uses the camera the way a painter uses a brush and that the actors are inanimate models posing for the artist. This was valid for the silent film, but the sound film is not so completely a plastic art. It is partly a dramatic art. Therefore the words of the screenwriter and his scenes of action contribute to the movie; the actress who can build a character is important; the cinematographer is not a dumb tool. This brush has a soul of its own. Milton Krasner's photography in *Bus Stop* and *Seven Year Itch* and Jack Cardiff's in *The Prince and the Showgirl* were vital in conveying the mysterious phosphorescence of Monroe."

Earlier, Zolotow relates how Leon Shamroy shot Marilyn Monroe's first screen test—on a 20th Century-Fox sound stage at half past five one morning, starting her on the road to fame and fortune.

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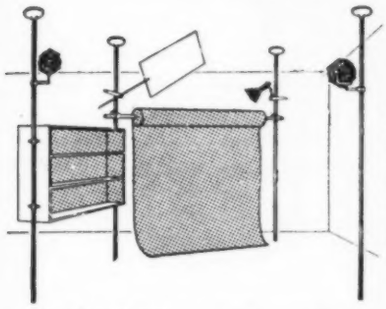

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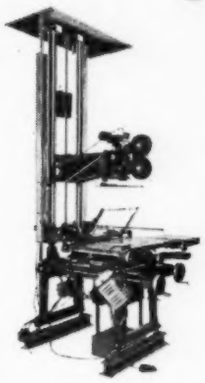

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An ingenious magnetic mounting system invented by Jos. Schneider & Co., German optical works, now permits photographers to use gelatin filters on their lenses with greater freedom and less risk of injury to the filters.

Heretofore, gelatin filters have had only limited use because they have been complicated to mount and are susceptible to damage. Their fine graded absorption values makes them desirable, however, particularly for color photography.

The Schneider system consists of a magnetic and a filter-holder ring. The magnetic ring screws into or fits the front of the lens by means of one of several adapters for nearly all the different Schneider lenses. A special adapter can be made up by the user for many other makes of lenses.

The filter hangs loosely in the front (holding ring) which is placed on the magnetic ring and stays in position by field attraction alone.

New Lens Formula Promises Complete Color Correction

A "superchromat" lens, the first ever to be corrected for all colors of visible light, is promised by an improved optical formula devised by Dr. Max Herzberger of Kodak Research Laboratories.

A three-element lens, made with three glasses chosen from a graph based on the new formula, is corrected for light from the ultraviolet to the infrared, or from 365 to 1,010 millimicrons.

Current lenses represent a compromise, since correction for two colors may cause chromatic aberration for the other colors in the spectrum. In a camera this would mean that images of differently colored objects photographed in the same position would fall in slightly different places on the film.

Previously, with special glasses called "short flints," it has been possible to correct some triple-element lenses for three colors only. These lenses are known as apochromats.

Kodak scientists discovered that a great number of glasses can be found which permit design of a unit of three lenses which they call a "superchromat." With this type of lens, images of all colors are in perfect register. ■

OFF THE PRESS—and undergoing close scrutiny by its editorial triumvirate is the new American Cinematographer Manual just published by the American Society of Cinematographers, Hollywood. Obviously pleased with the attractively printed and bound pocket-size handbook of technical information for cinematographers are, from left, Joseph Mascelli, who compiled and edited the Manual, and Walter Strenge, ASC, and Arthur C. Miller, ASC, Associate Editors.

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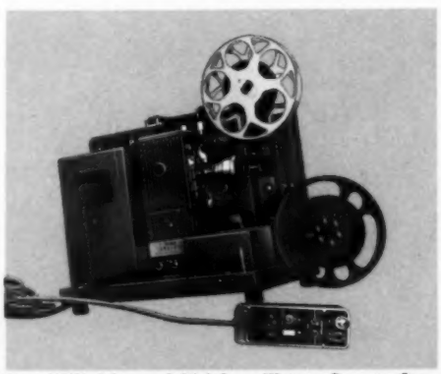

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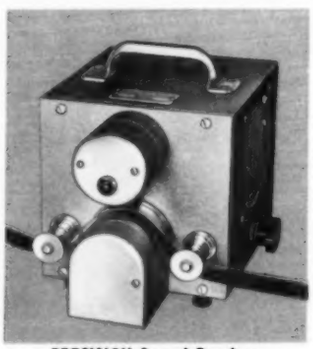

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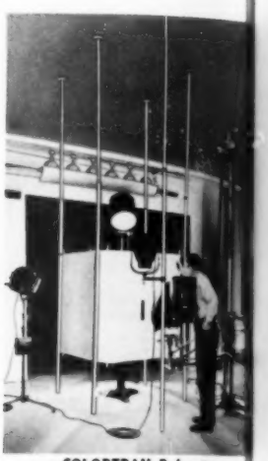

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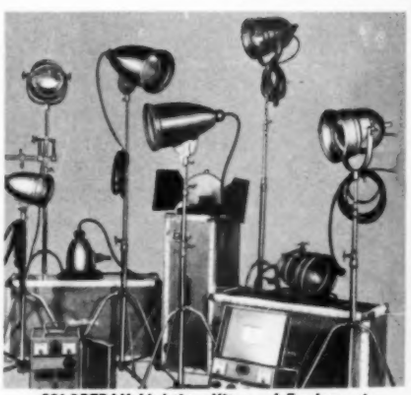

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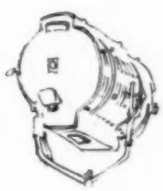

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PHOTOGRAPHIC ASSIGNMENTS

WHAT THE INDUSTRY'S CAMERAMEN WERE SHOOTING LAST MONTH

By MARION HUTCHINS

JOSEPH RUTTENBERG, ASC

Three - time Academy Award - winning cinematographer who is directing the photography of "The Spinster" in C-Scope and color at MGM studios.

ALLIED ARTISTS

CARL GUTHRIE, ASC, "The Big Bankroll" (Bischoof-Diamond Prod.) with David Janssen and Mickey Rooney. Joe Newman, director.

ROBERT KRASKER, "El Cid" (Samuel Bronton Prods.; shooting in Spain) with Charlton Heston and Sophia Loren Anthony Mann, director.

AMERICAN NATIONAL

BRICK MARQUAND, "Lock-Up"* (Ziv-TV) with MacDonald Carey.

RICHARD RAWLINGS, "The Case of the Dangerous Robin"* (Ziv-TV) with Rich Jason.

RICHARD RAWLINGS, JACK MARQUETTE, "Aquanaut"* (Ziv-TV) with Keith Larson and Jeremy Slate.

CURT FETTERS, MONROE ASKINS, JACK MARQUETTE, "Bat Masterson"* (Ziv-TV) with Gene Barry.

JACK MARQUETTE, "Sea Hunt"* (Ziv-TV) with Lloyd Bridges; "Klondike"* (Ziv-TV) with Ralph Taeger.

GILBERT WARRENTON ASC, "Master of the World" (Dyna-Magic & Color) with Vincent Price and Charles Bronson.

CASCADE PICTURES

WILLIAM SKALL, ASC, Commercials*.

GEORGE FOLSEY, ASC, Commercials*.

ELWOOD BREDELL, ASC, Commercials*.

HENRY SHARP, ASC, Commercials*.

ROY SEAWRIGHT, Commercials*.

COLUMBIA STUDIOS

FREDDIE YOUNG, "The Greengage Summer" (Color; P.K.I. Picts.; Shooting in France) with Kenneth Moore and Danielle Darrieux. Lewis Gilbert, director.

GERT ANDERSEN, ASC, "Donna Reed Show"* (Screen Gems) with Donna Reed. Andrew McCullough, director.

PHILIP TANNURA, ASC, "Dennis the Menace"* (Screen Gems) with Jay North and Herbert Anderson.

FRED GATELY, ASC, "My Sister Eileen"* Screten Gems) with Shirley Boone and Elaine Stritch. Oscar Rudolph, director.

IRVING LIPPMAN, "Dan Raven"* (Screen Gems) with Skip Homeier and Quinn Redeker.

JOSEPH BIROC, ASC, "The Devil at 4 O'Clock" (Shooting in Hawaii; LeRoy-Kohlmar Prods.; C'Scope & Color) with Spencer Tracy and Frank Sinatra. Mervyn LeRoy, director.

GAYNE RESCHER, ASC, "Mad Dog Coll" (shooting in New York; Thalia Films) with John Chandler and Kay Doubleday. Burt Balaban, director.

CHARLES LAWTON, JR., ASC, "Two Rode Together" (John Ford Prod.; color; shooting in Texas) with James Stewart and Richard Widmark. John Ford, director.

DOUGLAS SLOCOMBE, "Taste of Fear" (Hammer Films Prod.; shooting in England) with Susan Strasberg and Ronald Lewis. Seth Holt, director.

BURNETT GUFFEY, ASC, "Homicidal" (William Castle Prod.) with Glenn Corbett and Patricia Breslin. William Castle, director.

DESILU—Cahuenga

SID HICKOX, ASC, "The Andy Griffith Show"* (Desilu Prods.) with Andy Griffith.

ROBERT DE GRASSE, ASC, "Angel"* with Annie Farge and Marshall Thompson. Lamont Johnson, director.

WALTER STRENGE, ASC

One of the first cinematographers to shoot TV films in Hollywood, Strenge last month took over piloting the cameras on "Wagon Train."

DESILU—Culver City

CHARLES STRAUMER, "The Untouchables"* (Desilu Pods.) with Robert Stack and Jerry Paris.

LUCIEN ANDRIOT, ASC, ROBERT HAUSER, "Guestward Ho"* (Desilu Prods.) with Joanne Dru and and Mark Miller.

LOTHROP WORTH, ASC, "The Real McCoy's"* (Brennan-Westgate Prods.) with Walter Brennan.

DESILU—Gower

HAL MOHR, ASC, "Barbara Stanwyck Theatre"* (Desilu Prods.) with Barbara Stanwyck.

CHARLES VAN ENGER, ASC, "Lassie"* (Jack Wrather Prods.) with June Lockhart and Jon Provost.

ROBERT PLANCK, ASC, "My Three Sons"* (Desilu Prods.) with Fred MacMurray and William Frawley.

ROBERT HAUSER, "Wyatt Earp"* (Desilu Prods.) with Hugh O'Brian.

ROBERT PITTACK, ASC, "Ann Sothern Show"* (Desilu Prods.) with Ann Sothern.

LUCIEN ANDRIOT, ASC, "Harrigan and Son"* (Desilu Prods.) with Pat O'Brien and Roger Perry.

WALT DISNEY STUDIOS

EDWARD COLMAN, ASC, "Zorro"* with Guy Williams.

FAIRBANKS STUDIO

RAY FOSTER, ASC, Commercial*.

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FRANK REDMAN, ASC, "Perry Mason"* (CBS-TV) with Raymond Burr and Barbara Hale.

MEREDITH NICHOLSON, "Blue Angels"* (Gallu Prods.) with Don Gordon and Morgan Jones.

HAROLD LIPSTEIN, ASC, "Adventures of Ozzie and Harriet"* (Stage 5 Prods.) with the Nelson family. Ozzie Nelson, director.

HARRY WOLFE, "Hennessey"* (Hennessey Prods.) with Jackie Cooper. Don McQuire, director.

MAURY GERTSMAN, ASC, "Mr. Ed"* (Filmways Prods.) with Allan Young.

GOLDWYN STUDIOS

NORBERT BRODINE, ASC, EUGENE POLITO, "Loretta Young Show"* (Toreto Prods.) with Loretta Young.

RAY FOSTER, ASC, Commercials*.

INDEPENDENT

ALEXANDER TRAUNER, "Good-bye Again" (Argus Prod.; UA release; shooting in Paris) with Ingrid Bergman and Yves Montand. Anatole Litvak, producer-director.

ERWIN HILLIER, "The Naked Edge" (Pennebaker-Baroda Prod. for UA; shooting in England) with Gary Cooper and Deborah Kerr. Michael Anderson, director.

DANIEL FAPP, ASC, "West Side Story" (Panavision 70 & Color; Mirisch Picts—Seven Arts Prods.; shooting in N.Y.) with Natalie Wood and Richard Beymer. Robert Wise and Jerome Robbins, directors.

GORDON AVIL, ASC, "Miami Undercover" (shooting in Miami Beach, Fla.; Schenck-Koch Enterprises) with Lee Bowman and Rocky Graziano. Howard Koch, director.

CHRISTIAN MATRAS, "Paris Blues" (Pennebaker for UA; shooting in Paris) with Paul Newman and Joanne Woodward. Martin Ritt, director.

JOHN ALTON, "Birdman of Alcatraz" (Harold Hecht Prod. for UA release) with Burt Lancaster and Karl Malden. John Frankenheimer, director.

ARTHUR ARLING, ASC, "Caribe" (Caribe Prods.; shooting in San Juan, Puerto Rico) with Jackie Coogan and Marvin Miller. Russell Hayden, director.

Continued on Page 728

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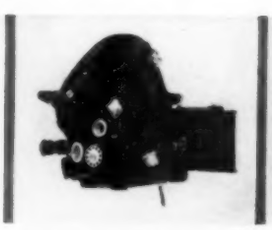

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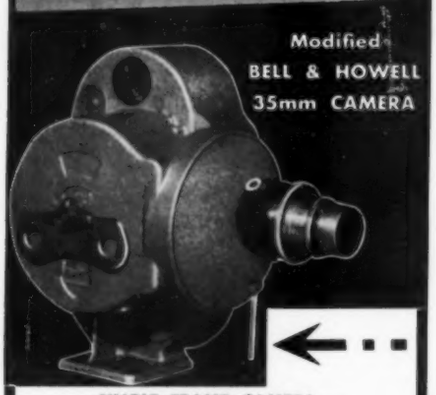

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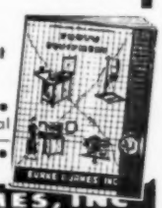

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PHOTOGRAPHIC ASSIGNMENTS

Continued from Page 724

METRO-GOLDWYN-MAYER

JOHN NICHOLAUS, "Rawhide"* (CBS-TV) with Eric Fleming and Clint Eastwood.

HARKNESS SMITH, "The Outlaws"*; "Blue and Gray."*

GEORGE CLEMENS, ASC, "Twilight Zone"* (Cayuga Prods.)

DALE DEVERMAN, NICK MUSURACA, ASC, "The Islanders"* with William Reynolds and James Philbrook.

STUART THOMPSON, ASC, "National Velvet"* (Velvet Prods.) with Lori Martin and Ann Doran.

EDWARD COLMAN, ASC
Shooting the "Zorro" TV film series at Walt Disney Studios. Colman previously photographed the "Dragnet" series.

PAUL VOGEL, ASC, "Oh, Those Bells"* (CBS-TV) with the Wiere Bros. and Henry Norell.

PAUL IVANO, "The Jim Backus Show"* (Calif. National Prods.) with Jim Backus and Nita Talbot.

WILLIAM SPENCER, "Peter Gunn"* (Spartan Prods.) with Craig Stevens.

GEORGES PERINAL, "Four Horsemen of the Apocalypse" (C'Scope & Color; Julian Blaustein Prod.; shooting in Paris) with Glenn Ford and Ingrid Thulin. Vincente Minnelli, director.

JOSEPH RUTTENBERG, ASC, "Spinster" (C'Scope & Color; Julian Blaustein Prod.) with Shirley MacLaine and Laurence Harvey.

N.B.C.

ALAN STENSVOLD, ASC, "Dinah Shore Show" (Sewanee Prods.; "Groucho Marx Show" (Film Craft Prods.) "Roy Rogers Show" (Sewanee Prods.).

PARAMOUNT STUDIOS

WILLIAM SNYDER, ASC, "Bonanza"* (NBC-TV) with Michael Landon and Dan Blocker.

FRANK PHILLIPS, "Have Gun Will Travel"* with Warner Anderson and Tom Tully.

FRANK PLANER, ASC, "Breakfast at Tiffany's" (Jurow-Sheperd Prod.; Technicolor; shooting in New York) with Audrey Hepburn and George Peppard. Blake Edwards, director.

RUSSELL HARLAN, ASC, "Hatari!" (Howard Hawks Prod.; Technicolor; shooting in Africa) with John Wayne and Gerard Blain. Howard Hawks, producer-director.

HARRY STRADLING, ASC, "On the Double" (PanaVision & Technicolor; Shavelson-Rose Prods.) with Danny Kaye and Dana Wynter. Melville Shavelson, director.

ROBERT BURKS, ASC, "The Pleasure of his Company" (Technicolor) with Fred Astaire and Debbie Reynolds. George Seaton, director.

PARAMOUNT SUNSET STUDIOS

FLEET SOUTHCOTT, "Gunsmoke"* with James Arness and Dennis Weaver.

REPUBLIC STUDIOS

CARL GUTHRIE, ASC, "The Law and Mr. Jones"* (Four Star Prods.) with James Whitmore.

ARCH DALZELL, "Michael Shayne"* (Four Star Prods.) with Richard Denning.

WILFRID CLINE, ASC, "Stagecoach West"** (Four Star Prods.) with Wayne Rogers and Richard Eyer.

HOWARD SCHWARTZ, "Robert Taylor Detectives"* (Four Star Prods.) with Robert Taylor.

EMMET BERGHOLZ, "Death Valley Days"* (Filmaster Prods.).

HARRY WILD, ASC, "Peter Loves Mary"* (Four Star Prods.) with Peter Lind Hayes and Mary Healy; "The Tom Ewell Show"* (Four Star Prods.) with Tom Ewell and Marilyn Erskine.

FRANK CARSON, "Dick Powell's Zane Grey Theatre"* (Four Star Prods.) with Dick Powell.

REVUE STUDIOS

WILLIAM DANIELS, ASC, "Come September" (PanaVision & Color: Seven Picts., UI Prod.: shooting in Italy) with Rock Hudson and Gina Lollobrigida. Robert Mulligan, director.

STANLEY CORTEZ, ASC, "Back Street" (Color: Ross Hunter-Carrollton Prod.) with Susan Hayward and John Gavin. David Miller, director.

MACK STENGLER, ASC, "Leave It to Beaver"* (Gomalco Prods.) with Barbara Billingsley and Hugh Beaumont. Norman Tokar, director.

JACK MACKENZIE, ASC, EMIL HARRIS, "Shotgun Slade"* (Revue Prods.).

ROBERT GOUGH, JOHN RUSSELL, ASC, "Wells Fargo"* (Overland Prods.) with Dale Robertson.

ROBERT GOUGH, "The Deputy"* (Revue Prod.) with Henry Fonda.

WALTER STRENGE ASC, "Wagon Train"* (Revue Prods.) with Robert Horton.

RAY RENNAHAN, ASC, EMIL HARRIS, "Laramie"* (Revue Prods.).

NEAL BECKNER, EML HARRIS, "Riverboat"* (Revue Prods.).

RAY CORY, ASC, Bringing Up Buddy"* (Kyro Prods.) with Emil Markey and Dora Morande.

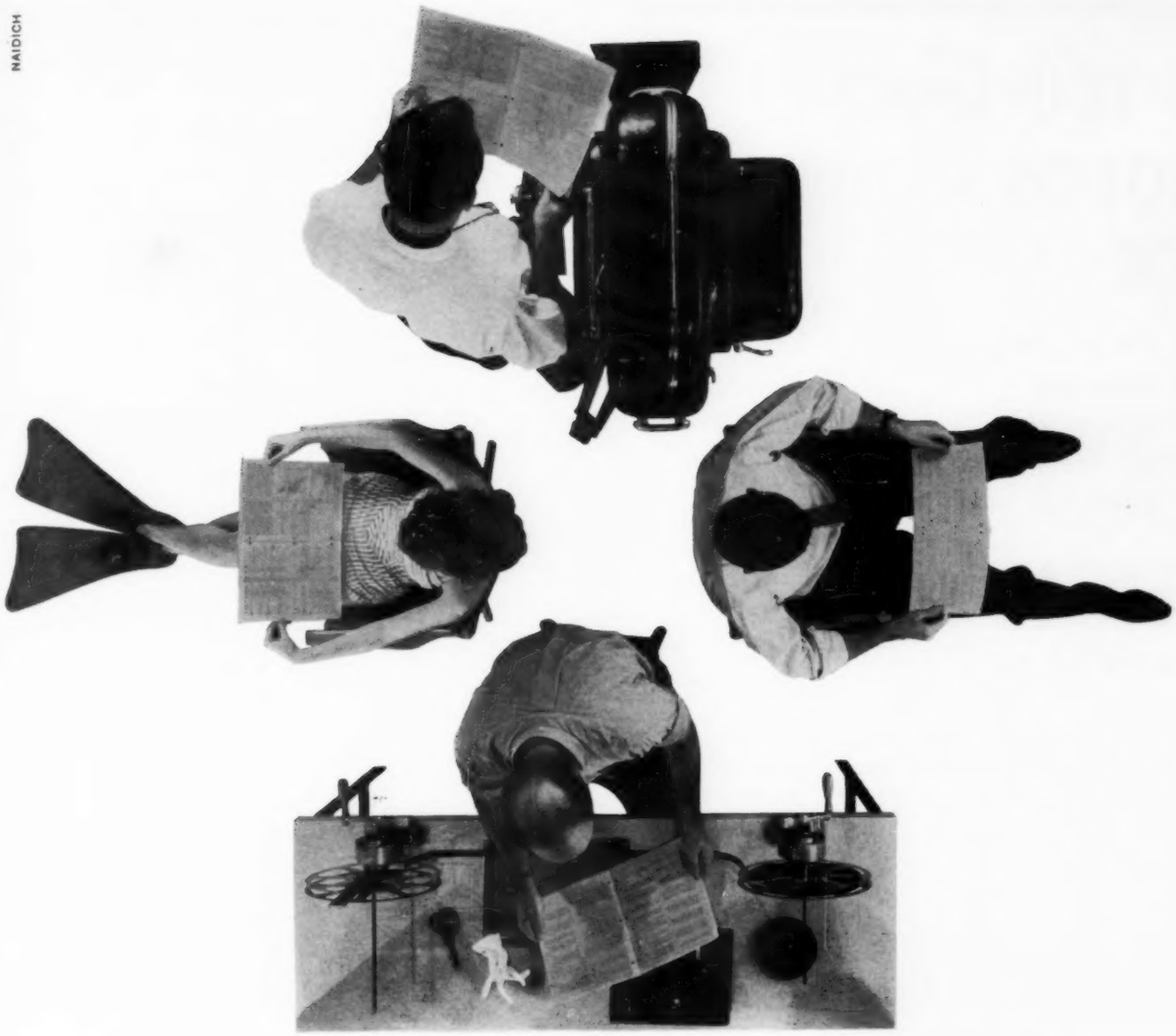
JOHN RUSSELL, ASC, NEAL BECKNER, "Alfred Hitchcock Presents"* (Revue Prods.).

ELLIS THACKERY, ASC, "Bachelor Father"* (Bachelor Prod.) with John Forsythe; "Westinghouse Playhouse"* (Revue Prods.).

Continued on Page 764

FRANK PLANER, ASC
Shooting "Breakfast at Tiffany's" in Technirama and color for Jurow-Sheperd Prodns. in New York.

NAIDICH



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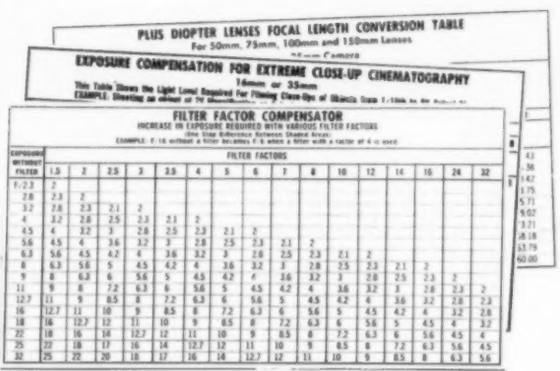
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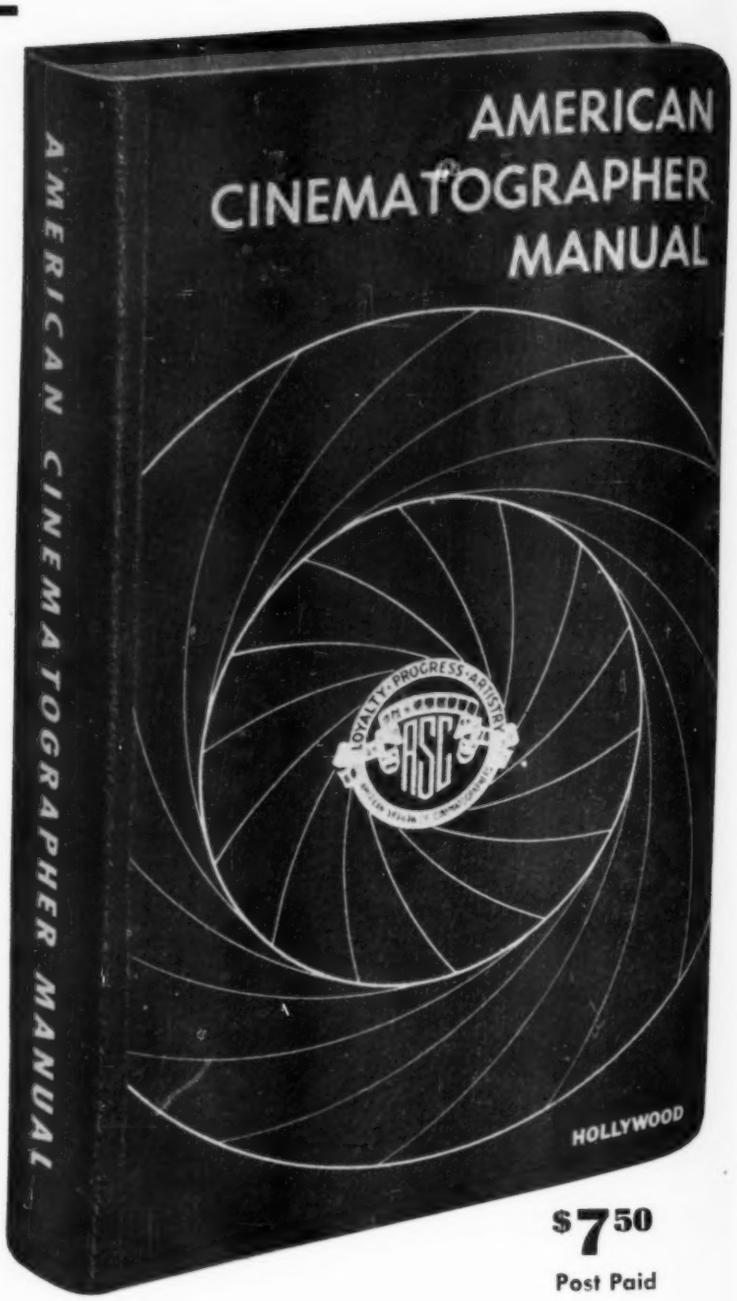
f: 2.3	2															
2.8	2.8	2														
3.2	3.2	2.8	2.3	2.1	2											
4	4	3.2	2.8	2.5	2.3	2.1	2									
4.5	4.5	4	3.2	3	2.8	2.5	2.3	2.1	2							
5.6	5.6	4.5	4	3.6	3.2	3	2.8	2.5	2.3	2.1	2					
6.3	6.3	5.6	4.5	4.2	4	3.6	3.2	3	2.8	2.5	2.3	2.1	2			
8	8	6.3	5.6	5	4.5	4.2	4	3.6	3.2	3	2.8	2.5	2.3	2.1	2	
9	9	8	6.3	6	5.6	5	4.5	4.2	4	3.6	3.2	3	2.8	2.5	2.3	2
11	11	9	8	7.2	6.3	6	5.6	5	4.5	4.2	4	3.6	3.2	3	2.8	2.3	2
12.7	12.7	11	9	8.5	8	7.2	6.3	6	5.6	5	4.5	4.2	4	3.6	3.2	2.8	2.3
16	16	12.7	11	10	9	8.5	8	7.2	6.3	6	5.6	5	4.5	4.2	4	3.2	2.8
18	18	16	12.7	12	11	10	9	8.5	8	7.2	6.3	6	5.6	5	4.5	4	3.2
22	22	18	16	14	12.7	12	11	10	9	8.5	8	7.2	6.3	6	5.6	4.5	4
25	25	22	18	17	16	14	12.7	12	11	10	9	8.5	8	7.2	6.3	5.6	4.5
32	32	25	22	20	18	17	16	14	12.7	12	11	10	9	8.5	8	6.3	5.6

Charts, tables diagrams and drawings such as these give instant answers to problems relating to lens angles, filter factors, shutter openings, camera speeds, exposure, lighting, aspect ratios, etc., etc.

INFORMATIONAL text covers data never before published on panning speeds, optical effects, ultra high-speed photography, underwater cinematography, background plates, process shots, traveling mattes, day-for-night photography, color temperature, etc.

INCLUDED ALSO: A glossary of motion picture technical terms in five languages: English, Spanish, French, Italian, and German.



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Filming The Behavi f H

By JOSÉ VINCENTE SCHEUREN

Dept. de Ciné y Laboratorio de Fisiopatologia, Instituto Venezolano de Investigaciones Cientificas, Caracas, Venezuela.

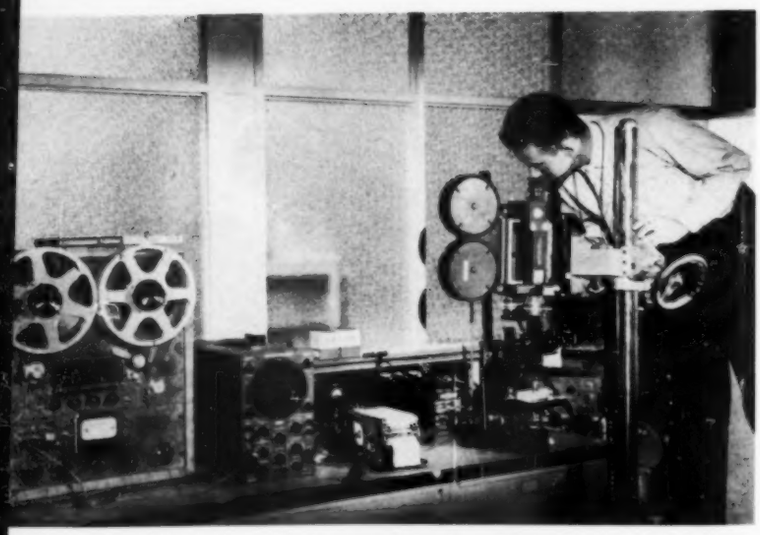

FIG. 1—Complete photographic and sound recording set-up in I.V.I.C.'s Cine Dept. From left are: Ampex tape recorder, oscilloscope, and Mitchell NC 35mm camera mounted vertically over microscope. (All photos are by the author).

FIG. 2—Shown here is method by which the Mitchell camera was mounted over microscope. Note extension tube interposed between camera and working lens. Technician in foreground is adjusting unique equipment through which sound created by parasite was recorded in sync with the picture.

PROBABLY THE SMALLEST "actor" ever to "talk" for a motion picture is the hookworm, which is the subject of "The Hookworm Speaks," a documentary film recently produced for I.V.I.C. (Instituto Venezolano de Investigaciones Cientificas) in Caracas, Venezuela. The film, which screens for 14 minutes, was shot on 35mm Eastman Color Type 5248 film and describes the scientific research conducted on the subject in the Institute by Drs. Marcel Roche, Carlos Martinez Torres, and Leon Macpherson.

The main actor in our documentary film is the Hookworm (Ancylostoma caninum), a tropical parasite which enters the dog body and produces anemia. Man is infected with a similar parasite, called Necator americanus. The length of the Hookworm is about 10mm and its diameter less than a millimeter.

Mitchell 35mm Camera Used

The equipment used to photograph this subject was a Mitchell NC 35mm camera with special extension tubes, which permitted working very close to the subject through the microscope. Although the documentary shows the original methods devised by I.V.I.C. scientists for studying the Hookworm, in this article reference is made only to the microcinematography itself.

In order to be able to photograph through the microscope with a motion picture camera, it was necessary to mount the camera on a special base (Figs.

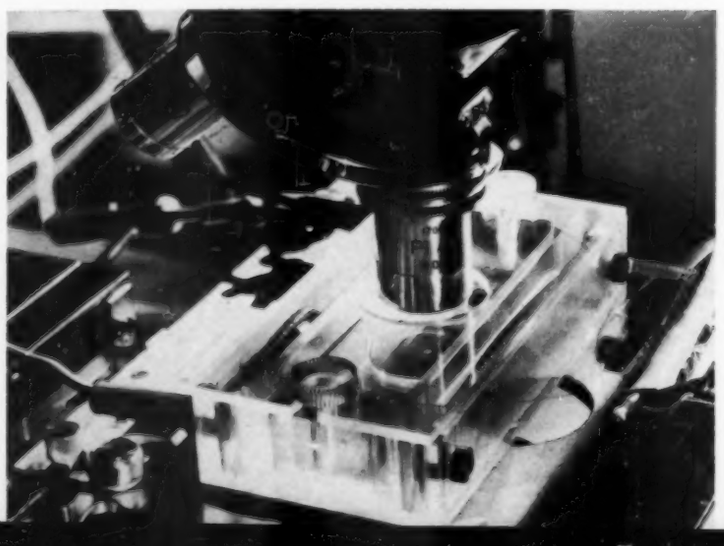

FIG. 3—Closeup of equipment referred to in Fig. 2 in which silver microelectrodes connected to the blood and saline solutions containers in which the hookworm has been introduced, are connected to a special high-gain amplifier and the tape recorder and oscilloscope shown in Fig. 1.

Hookworms In Color And Sound

By means of microcinematography, Venezuela researchers record habits of dreaded tropical parasite. Simultaneously, the electrical potentials produced by its sucking motion were converted electronically into sound and recorded on magnetic tape.

1 and 2) which allowed filming close to the microscope's eyepiece.

In addition, it was necessary to interpose an extension tube one-inch long between objective and camera. The 35mm lens was ideal for obtaining an image covering the complete field of the frame. For larger magnifications of the object higher magnifications through the microscope were utilized. The microscope lenses are of course all achromatic. After several tests it was discovered that the ordinary lighting from the microscope was sufficient, as long as the maximum intensity was used. Focusing was performed through the microscope's own mechanism, the camera lens being set at infinity. It was often difficult to achieve sharp focus on the groundglass surface but the resulting image turned out exceedingly sharp.

The Photography

As the Hookworm is a real and live being, shooting was done at the standard speed of 24 fps. Once the worm was framed on the microscope field the image was "passed" to the camera field for the final framing and refocusing. It was invariably very difficult to keep the worm centered because of its active movements, all of them unpredictable and mostly out of the camera field. After many hours, days and weeks we finally got the desired shots of the worms sucking blood. It was impressive to see how much blood one worm could ingest and to observe through the microscope how the blood gushed into the worm's mouth and through the esophagus (Fig. 4).

We found it easier to focus and shoot when the worms started to suck, at which time they remained relatively quiet for longer periods of time. In this way we were able to make "cuts", showing first a long shot, followed by medium and closeup shots of the worm (Fig. 6). After obtaining the shots showing how the worms suck blood it was then necessary to show how they expel it. With a special apparatus

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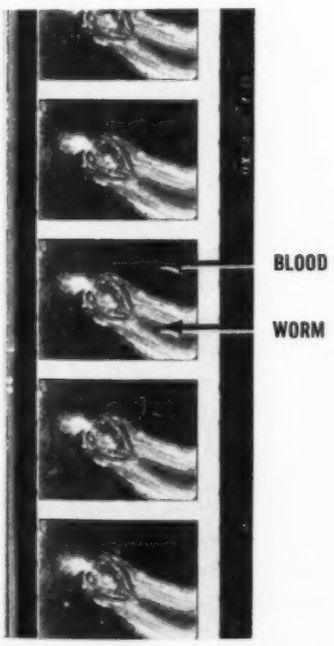


FIG. 4—35mm film frame reproductions show hookworm sucking blood. Mouth and esophagus are clearly visible.

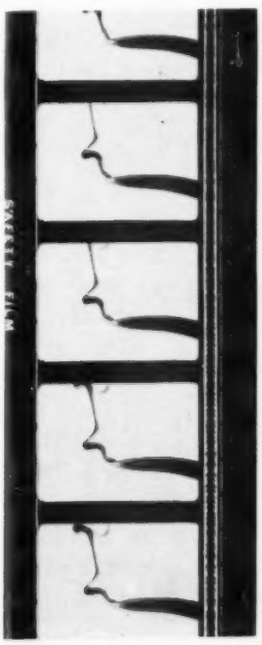


FIG. 5—Sequence of 35mm frames showing blood being expelled by hookworm in a cigarette smoke-like pattern.

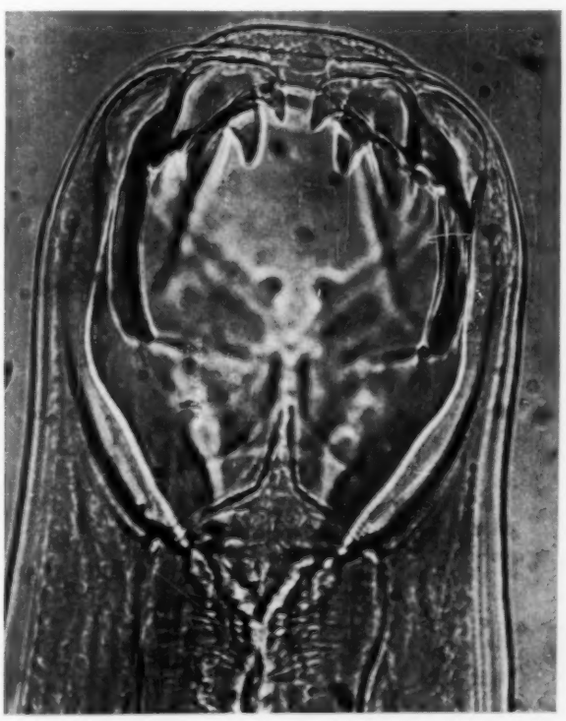
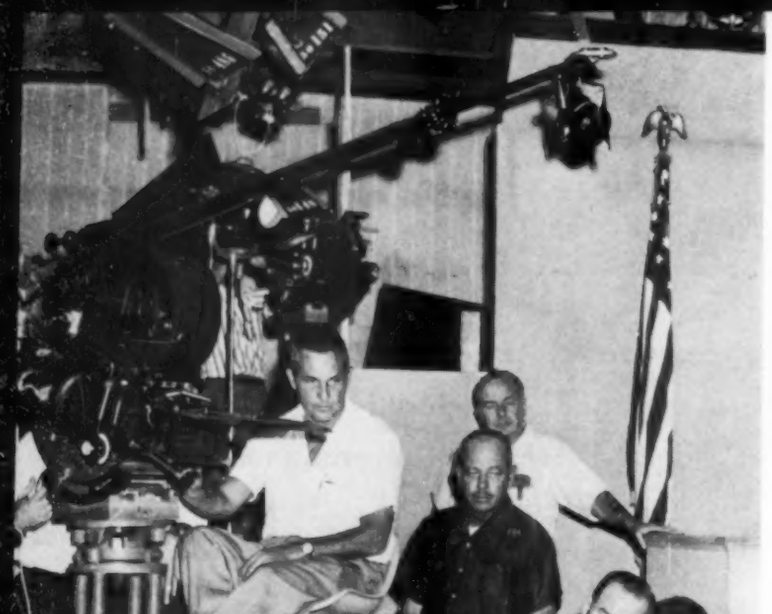


FIG. 6—Closeup of hookworm's mouth as seen through the microscope. Parasite's peculiar sucking motion produced electrical potentials which were converted electronically into sound and recorded on tape for picture's soundtrack.



IN TELEVISION film photography, the ratio of key to fill light should not exceed 2½-to-1, and the maximum brightness ratio of scene elements should range between 20-to-1 and 30-to-1.

Cinematography For Television Films

Lack of important component in average home TV receiver dictates certain lighting and photographic requirements for best reception of television films.

By EDWARD P. ANCONA, JR.

THE FOLLOWING article is reprinted from the new American Cinematographer Manual, and typifies the many technical articles helpful to cinematographers which appear throughout this latest publication of the American Society of Cinematographers. (Descriptive illustrations have been added here to clarify technical points.) The author, Edward P. Ancona, Jr., was formerly staff engineer for the Motion Picture Research Council's Television Film Engineering Department.—EDITOR.

TELEVISION RECEIVERS characteristically are viewed with some room lights on. The resulting ambient light falling on the receiver screen tends to degrade and wash out the image shadows. Also, if the receiver brightness control is improperly adjusted, a further degradation of the shadow scale will take place. The combination of these effects requires that the television film photographer avoid scenes or effects which rely upon accurate or subtle rendition of shadow detail.

Another factor, even more serious in its effect upon the correct rendition of grey scale values on the home receiver, involves a portion of the receiver circuit known as the "d.c. restorer." The function of the d.c. restorer might be described as that of an automatic brightness control which maintains a constant effective brightness setting on the picture tube as the scenes vary in average brightness. In a receiver *with* a d.c. restorer, scenes will be correctly represented regardless of their average brightness; for instance, a dark, low key shot will be reproduced as a dark low key scene, and a fade-out will make the picture tube black. Likewise, a high-key shot, such as an actor against the sky, will be reproduced as a bright scene, and the middle tones, such as the actor's face, will be correctly rendered. In a receiver *without* a d.c. restorer, however, the dark low key scene will be reproduced as a washed out grey scene, and the fade-out will appear as a fade to a medium grey. The high-key shot, in the receiver *without* a d.c. restorer, will be reproduced with insufficient brightness, and the middle tones, such as the actor's face, will be reproduced too dark. The receiver *without* d.c. restoration will correctly reproduce scenes of *average* content, but high-key ("cowboy against the sky") and low-key ("day for night" or large areas of black) scenes will not reproduce correctly.

This behavior of the receiver *without* d.c. restoration is similar to the failure of a reflected light exposure meter to indicate correct exposure on some scenes. This type of meter will give the correct exposure for "average" scenes but will give erroneous readings for scenes with large dark or light areas. An incident light meter, of course, would give the correct exposure in any case, since its readings are a function only of the intensity of light falling on the scene.

To achieve the most effective reproduction on receivers *without* d.c. restoration, the cinematographer should therefore attempt to balance lighting

and camera angles to produce scenes which would give approximately equal exposure indications on the two types of meters. Those scenes which would indicate too low an exposure on the reflected light meter can be corrected by increasing illumination of dark areas, or by moving brighter objects in the scene closer to the camera, so as to fill more of the frame area with light. Scenes which would indicate too high an exposure on a reflected light meter can be corected by framing to include less of the bright areas in the picture, by obscuring part of a large bright area with a tree branch or similar effect, or by moving darker objects closer to the camera so that the total highlight area of the scene will be reduced.

D.C. Restorer Missing

The dismaying fact is that practically all black-and-white television receivers manufactured in the U. S. since about 1950 do *not* have d.c. restorers. Only color receivers and some of the custom-built black-and-white receivers are so equipped. The cinematographer who is photographing television films must therefore take this fact into account, since some otherwise effective scenes will not be properly reproduced on the vast majority of home receivers. It must be emphasized that this failure to reproduce a correct gray scale on some scenes is *not* an inherent property of television. Present day television equipment and standards are capable of reproducing a remarkably good picture, and the film program signal transmitted from most stations can be reproduced as a high quality image, essentially correct in its grey scale content regardless of the type of scene. The poor quality many people have come to expect from television is largely a product of typical receiver design and haphazard viewer adjustments. *Effective television film photography, therefore, demands that the cinematographer understand not only the fundamental limitations of television film reproduction, but the typically poor conditions under which the great majority of receivers are operated.*

Cinematographers should be aware that all picture monitors in television broadcasting studios are equipped with d.c. restorers and therefore do not perform like home receivers. However, some studio monitors are provided with a switch which removes the d.c. restorer, and if the cinematographer has occasion to review one of his films on "closed circuit" he should ask to have the d.c. restorer removed from one monitor so he may properly judge the effectiveness of the film as it would appear on a typical home receiver.

Transmitting Characteristics

For many years the *iconoscope* was the camera tube used in the television film camera chain through which motion picture films are televised. The iconoscope suffered from spurious signals which were a

Continued on Page 753

WHENEVER POSSIBLE, a "white reference" and a "black reference" should be included in each scene as a guide to the video operator in establishing proper transmission levels. Here the white tablecloth and girl's black hair would provide the required references.

NIGHT EFFECTS should be implied or suggested (lighted window, street lamp, apparent single source of light, etc.) rather than by shooting almost fully dark scenes or by printing down, as in "day-for-night" effects.

TV FILM PHOTOGRAPHY should consist of closeup and medium shots as much as possible. Long shots should be used only to establish perspective or to cover wide range action. (All of the above photos have been selected to illustrate the examples set forth, and are not necessarily reproduced from television films.)

CAMERA SET-UP for a rain shot for "Studs Lonigan" (note protective covering on camera). Awaiting the director's order to "roll 'em!" is Director of Photography Arthur Feindel, ASC, (in white jacket).

Photography That Advances The Story

Unusually bold low-key lighting marks the black-and-white photography of "Studs Lonigan" by Arthur Feindel, ASC.

By DARRIN SCOT

IN PHOTOGRAPHING "Studs Lonigan," Director of Photography Arthur Feindel, ASC, has created a style of off-beat cinematography so daring in its conception that it lends stunning dramatic impact to an otherwise rambling film story. Because the producers have attempted to cram into a normal feature running-time the weighty essence of James T. Farrell's famous trilogy of novels, "Lonigan" is necessarily episodic—a fault compounded by direct cuts between sequences taking place years apart. By creating a consistent visual mood throughout, Feindel not only has helped considerably to draw the disjointed episodes more tautly into a unified fabric, but he has also admirably captured a very special aspect of Chicago during the Roaring Twenties.

This period is, for Studs, a hopeless era as lived in the shabbily respectable tenements of a dirty clanging city which is, to him, more often frightening than exciting. He drifts with the currents—overpowered by a possessive mother and a tyranical father, wasting his young years in the green-shaded sanctuary of the pool hall, worshipping from afar the pedestal-placed image of a girl who turns out to be too "nice," finding spasmodic moments of surcease first in liquor and then in the arms of a love-starved school teacher. In the end, when she recovers her senses and turns him away, he seduces her niece, gets her pregnant, and begs her to marry him while pitifully flagellating himself into believing that he loves her. He is, up until the final abrupt fadeout, a lost soul who never finds himself.

The "Windy City," seen through the tormented eyes of the adolescent Studs, is a jungle of shadowy night and bleak daylight, of weird viewpoints and distorted perspectives. By means of extreme low-key lighting and radical camera angles the photography captures these almost psychopathic undercurrents and thus becomes a much more important element in the total effect of the film than photography is usually conceived to be. Working closely with Di-

Continued on Page 758

UNUSUAL FOLLOW SHOT of billiard ball rolling toward and into a corner pocket was accomplished by use of zoom lens on an Eclair Camerette.

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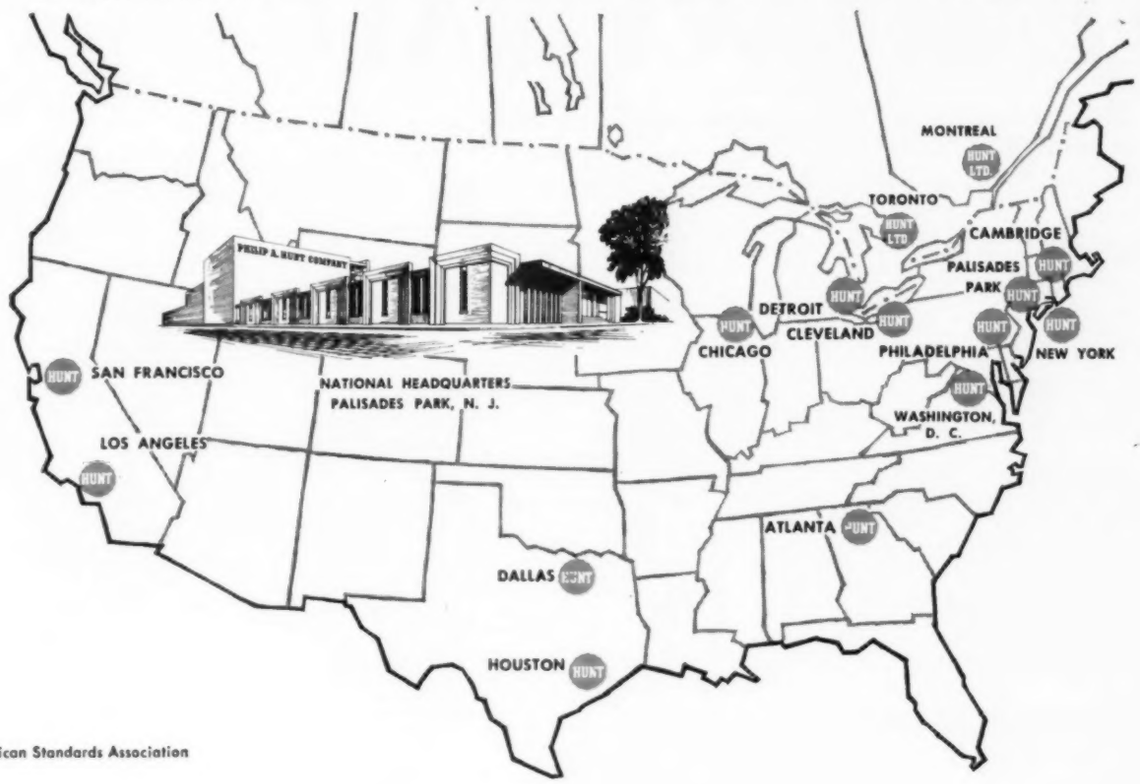

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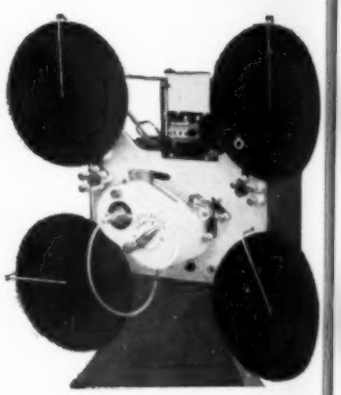

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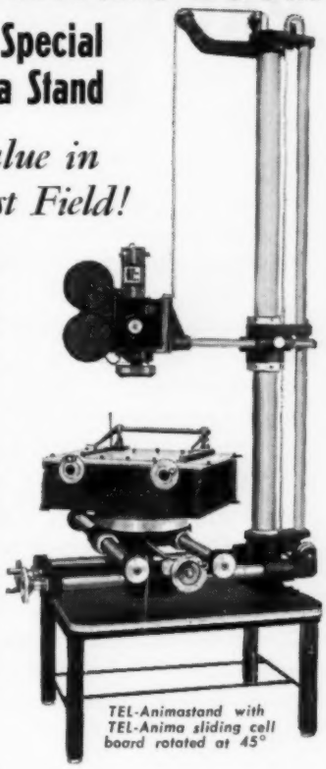

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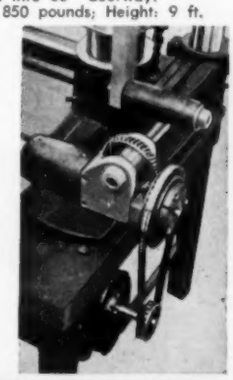

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NOTE: Continuing our editorial program to bring readers important literature on the subject of traveling matte processes and matting process substitutes, American Cinematographer *presents this third in a series of articles—the first two having appeared in our November, 1960, issue. (An earlier article on matte processes by Ray Kellogg and L. B. Abbott was published in our October, 1957, issue).*

The author, who is a veteran cinematographer, is associated with MPO Videotronics, Inc., New York, N.Y. His paper, which follows, was presented at the Convention of the Society of Motion Picture and Television Engineers in Miami Beach, Florida, May 7, 1959 and subsequently was published in the Journal Of The SMPTE *(Vol. 69, No. 6). It is reprinted here by permission.*—EDITOR

IN MAKING MOTION PICTURES it is often necessary to combine picture information from several pieces of film onto one piece of film, which is usually called a composite. Over the years, combining several pieces of film has been done in many ways, with varying degrees of success.

One method of combining one or more foreground actions with a background is by making a matte. A matte is usually a piece of film which has an opaque portion. If the matte is bi-packed when printing the background, an unexposed portion of the film corresponding in shape and size to the opaque portion is obtained. Then something of the same shape and size can be printed into that unexposed portion from a piece of film that has been photographed at another time.

When this opaque portion is moving and therefore changes its shape, size and relative position in the frame, it is called a "traveling" matte.

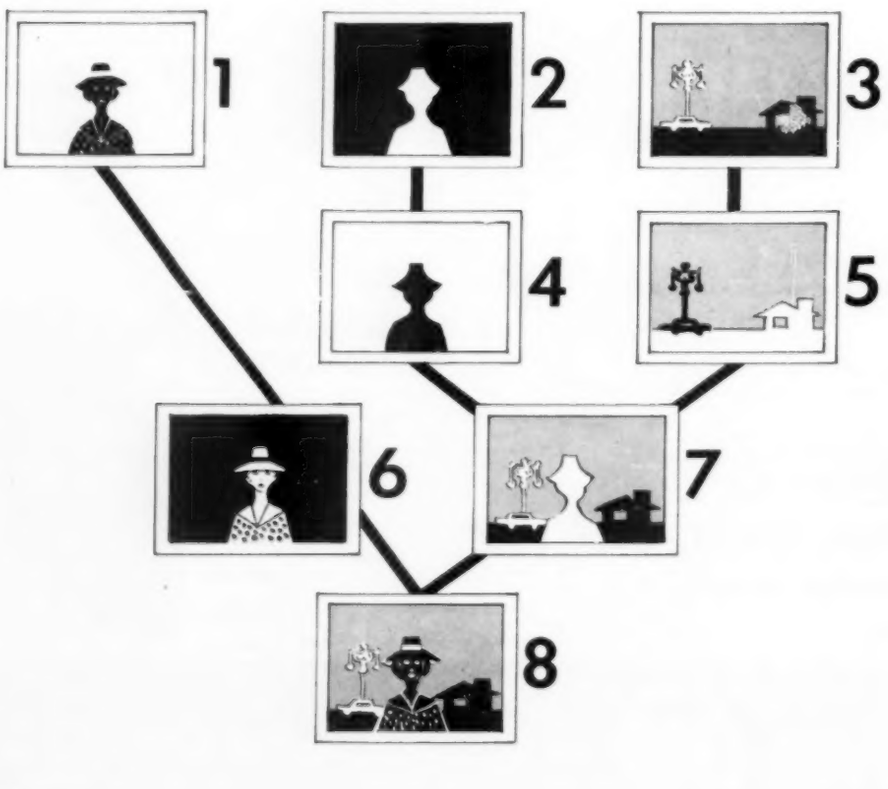

FIG. 1—Showing the eight steps employed in the infrared self-matting process described by author: 1—Conventional modulated negative of subject against clear background. 2—Opaque BG (background) with clear silhouette of subject produced via infrared exposure. 3—Negative of BG. (A fine-grain print would also serve here). 4—Positive matte obtained by making hi-contrast print of the IR negative matte. 5—Fine-grain print of BG. 6—Fine-grain print of the visual negative with opaque BG. 7—Print of BG in step 5 on negative stock, made by bi-packing 4. Before film is developed, image 6 is also printed thereon in exact register. 8—Resultant composite negative.

There are several traveling matte processes, the one to be employed being selected for reasons of economy or personal safety for achieving an effect impossible to achieve in a conventional way, or for a combination of these requirements.

In the conventional rear-screen process a background called the plate is projected onto a screen, the foreground action is put in front of the screen, the two elements are photographed, and a composite negative with the two elements combined is recorded.

Obviously the portion of the background which is eclipsed by the foreground is not photographed. It stands to reason, therefore, that if this portion of the background could somehow be left unexposed when making the plate, the foreground could then be exposed onto that unexposed area or "hole." This is exactly the principle of all traveling matte processes.

Infrared Traveling Matte Process

The infrared traveling matte process was invented and patented by Leonard Pickley and developed to its present efficiency by MPO Videotronics, Inc., through many months of experimentation and research.

The beamsplitter camera used by MPO is the 3-Strip Technicolor camera, developed for the Technicolor process. It uses three strips of film: two in one gate and one in the other. We have modified this camera to the extent that we use only two strips of film and have changed the beamsplitter prism to suit our purpose. We thread the gate behind the prism with a film stock sensitive to visual light, such as all panchromatic films or color films, and from now on we shall call these films "visual films." We then thread the so-called bi-pack side of the camera with infrared film, which is sensitive to the infrared portion of the spectrum from about 700 to 900 ms. The infrared part of the spectrum covers a much larger range, but we are concerned only with that portion to which our infrared film stock is sensitive.

The problem was to expose the background and nothing but the background on the infrared film. At the same time we wanted to expose the foreground action and nothing but the foreground action on the visual film. Obviously, if we could achieve that, then we could simply make a print of the infrared negative which we call a matte—bi-pack this matte when we print the plate, and print the foreground action into the resulting hole. This is exactly what the various traveling matte processes are doing in one manner or another.

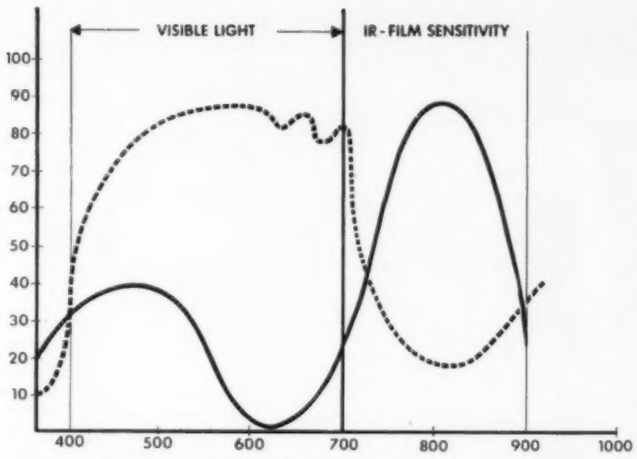

FIG. 2—Curves graphically explain core of process. Solid line is sensitivity curve of infrared film. Broken line is transmission curve of dichroic filter coating on foreground lighting equipment used in process.

Preparation of Background

In order to achieve our purpose we had to be able to "light" the background with infrared rays. (This is a paradox because infrared rays are invisible to the eye and therefore it is incorrect to call them "light" in our terminology.) At the same time this background had to appear black to the visual film. Therefore we had to find a black background which was only infrared reflective.

After some research we found a black velour which, when treated with a certain black dye (name and formula unknown, but the material is available through theatrical drapery supplies), is quite infrared reflective. Further, we found that by backing up

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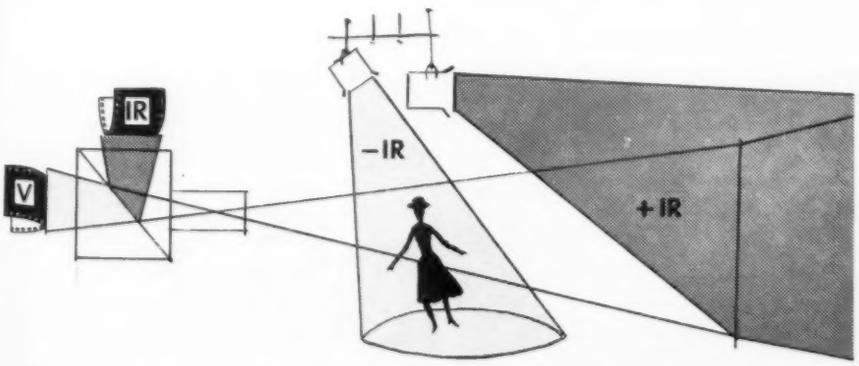


FIG. 3—How the infrared self-matting process works: Subject in foreground is lit with minus-infrared illumination while background is "illuminated" with minus-infrared rays. Beam-splitter in camera at left separates and diverts the +IR and —IR images to their respective negatives.

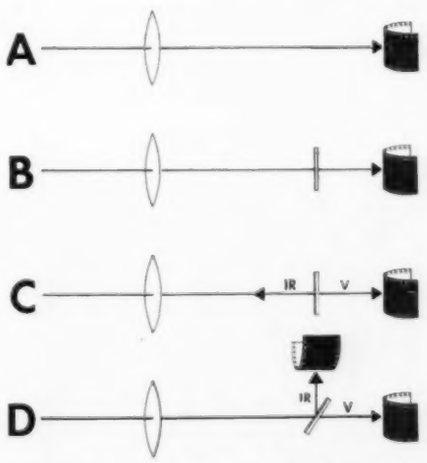


FIG. 4—C and D show how infrared is reflected by specially coated glass (or prism), as compared with examples A and B.

CHARLIE SEE has traveled around the world twice and shot money-making stills and movies in more than fifty countries. Here he pauses during shooting of a native ceremony in Guatemala.

IS THERE A FUTURE IN FREE-LANCING?

It's paid off for Charlie See who parlayed a $40 second-hand camera and $200 worth of film to a lucrative global business. Today he's official photographer for the International Beauty Congress.

By CLIFFORD V. HARRINGTON

CLIENTS WITH MOVIE assignments for for Charlie See, Hollywood free-lance still and movie photographer, rarely look for him in his home office. Instead they flash overseas telegrams to such places as London, England; Durban, South Africa; Lima, Peru; or Istanbul, Turkey—with better chances of finding him.

His list of movie credits reads much like a Cook's tour of the world. *Isle of Bali, Venetian Holiday, Beautiful Rhine, and Guatemala: The Land Where Rainbows Begin* are only a few examples.

See is always on the go. In fact, he has set for himself the ambitious goal of photographing every country on the globe. He may just come close to succeeding, because he already has made color films in 53 countries after only eleven years in the business.

Charlie See is a double-duty man. He is living proof that movies and stills do mix, if the right man is behind both cameras. For three years, 1957 to 1959, See was under contract to Max Factor for the express purpose of recording the Miss Universe contest in both stills and movies. He also accompanied Miss Universe on her world travels. Today, See is official cinematographer for the International Beauty Congress which takes place annually in Long Beach, Calif.

He has filmed the annual event since its inception. Many of his pictures of the pageant have been used officially.

It was the Miss Universe contest which gave See his big break. When this contest first was inaugurated, he had been trying to make ends meet in Los Angeles by going from door to door shooting baby pictures.

In filming the Miss Universe contest, he realized that he would be up against some of the toughest competition in the business. He figured he would have to focus his camera on new and different angles of the event — on phases other cameramen were missing. His first discovery was that no cameraman was covering the important preliminary events of the contest in 16mm color—such things as arrival of the various contestants, etc.

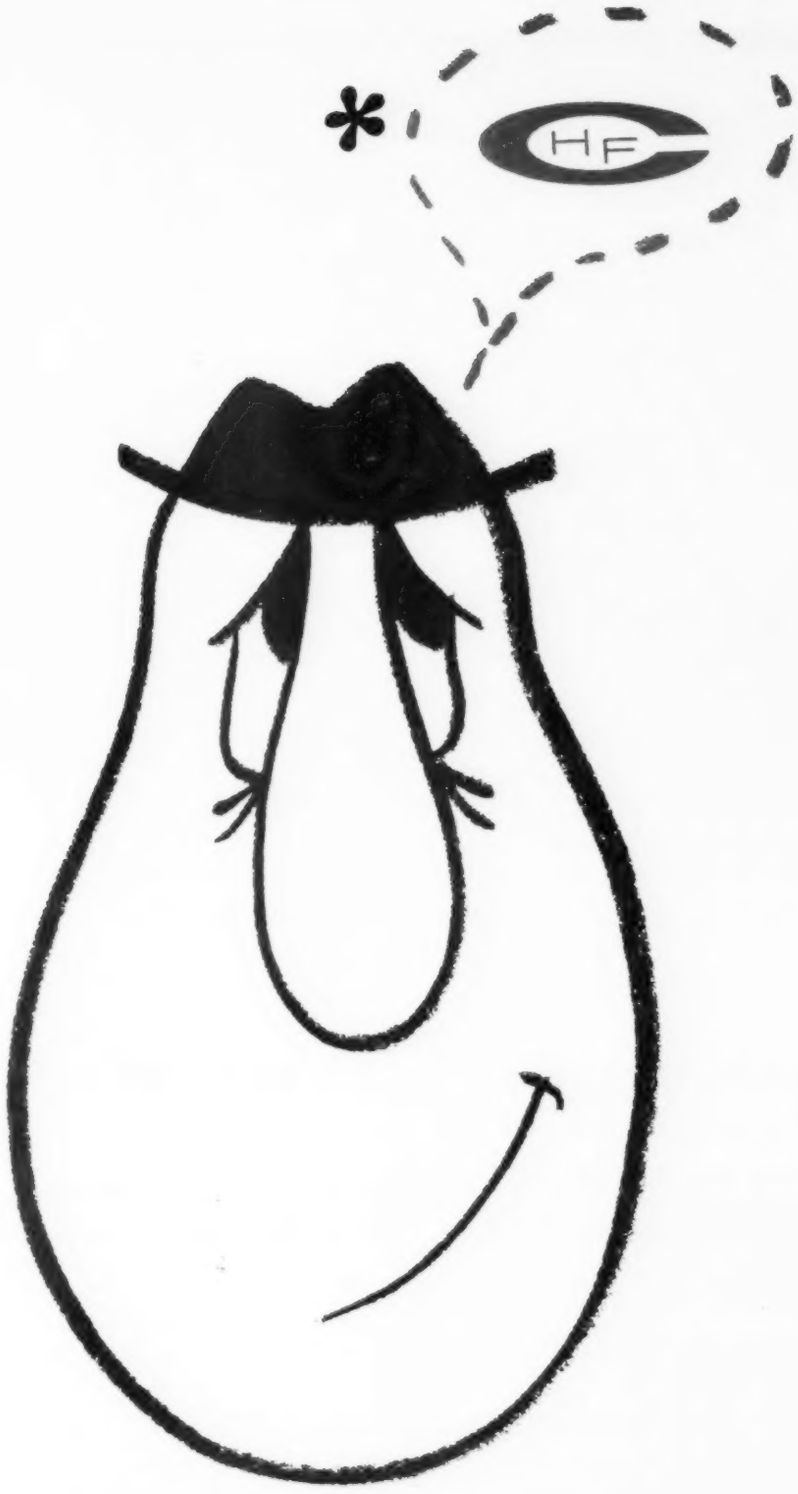
See invested $40 in a second-hand Keystone 16mm single-lens camera and

Continued on Page 750

HONG KONG—Native movie stars are willing subjects for See's battery of cameras.

ATHENS — Tzeny Loucea — "Miss Greece" — poses against Acropolis for See's movie camera.

ITALY—See films important sequence depicting school activities for a documentary.



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ANALYTICAL MOVIE-MAKING—Upsala College, East Orange, N.J., coach Fred Weiboldt (2nd from left) directs his cameraman in shooting his varsity players in both offensive and defensive plays. Films enable players to see themselves in action and analyze mistakes.

Coaching Basketball With Movies

Leading basketball coaches now using movie cameras to record teams in action as coaching aid in developing player techniques.

By HAROLD HAINFELD

With the motion picture camera being widely used today for motion analysis in many and varied fields of sports, industry, etc., it was inevitable that it would ultimately find an important place in the training programs of basketball teams.

Earlier, baseball and football coaches were the first in the world of sports to realize the important contributions motion pictures could make in providing a graphic analysis of the playing action of a team or of individual players.

Basketball coaches, like their colleagues in football, have now discovered the importance of game movies as an aid to their coaching methods. And while the sport has not been subjected to the probing lens of the movie camera to the extent it has in football, the potential benefits are identical. More and more college basketball coaches today are using 16mm films to improve team performance.

Coach Adolph Rupp, of the University of Kentucky, has used 16mm movies primarily to test all phases of individual play. It's the only actual record of a game you can have, he points out, and is much more trustworthy than one's memory; when you run a play back to a boy, there can't be any argument about it when it's there to see on film, he argues.

The basketball team of St. Peters College in Jersey City, N.J., which has participated in National Invitational Tournaments in Madison Square Garden in New York, is coached by Don Kennedy, an enthusiastic booster for movies as a training aid. "Mistakes

shown to the boys by means of film before the start of the regular season," says Kennedy, "aren't likely to be repeated during a conference game when it can really hurt you."

Coach Fred Weiboldt of Upsala College, East Orange, New Jersey, believes strongly in filming preseason practice plays. During these games, which are played in the College gym, Coach Weiboldt has a capable cameraman and a Bolex 16mm camera on hand shooting important action.

Fast Films, Lenses Helpful

There are a number of developments which have encouraged more and more colleges and high schools to film their basketball games. Much better lighting is being provided in the gym and fieldhouses now being built, so that shooting movies in "existing light" is productive of good results. Adequate lighting has always been an important factor in getting quality game movies; and it goes hand-in-hand with the need for well-lighted areas for physical education classes and indoor sports activities, too.

However, coaches using the older gyms needn't be discouraged about the poorer light usually found there, thanks to faster camera lenses and movie film. Recently Paillard has introduced fast Cinor lenses for both the Bolex 16mm and 8mm cameras having apertures of f/0.95 and f/0.9 respectively. Such lenses make it possible to get good movies in relatively poor light.

Another help has been the development, by Eastman Kodak, DuPont and Ansco, of high-speed motio picture films. I have used DuPont 931 film in shooting games in New Jersey college and high school gyms with excellent results.

As a Bolex camera user, I find that the Bolex Unimotor is an important adjunct to shooting fast action by means of "existing light" and fast film. When shooting football movies, the cameraman can rely entirely on a spring-motor drive, as it is possible to rewind the spring after each play so the camera will not run down in the middle of a shot. In basketball, however, the play is continuous, and affords little or no time to rewind a camera motor. With the Unimotor mounted on a Bolex, an entire hundred-foot roll of film may be exposed in a continuous run, if necessary—often essential in filming basketball continuity.

The Unimotor operates on either 6-volt batteries or regular 110-volt house current converted by means of a step-down transformer.

Film Requirements

To shoot the average high school basketball game, which is usually played in eight-minute quarters, will require about 800 feet of 16mm film. College games, which are played in 20-minute halves, will require about 1,200 feet. It is possible, of course, to use less film and still get adequate information for coaching purposes.

Experience has shown that the best position in which to set up the camera is near that point where the end and side lines meet. Coaches who have previously used movies generally have a plan in mind for the camera coverage. During the first half, for example, it is a good idea to concentrate on filming team defense. The second half can be devoted to offensive play. While this plan enables the cameraman to get only about half of the game on film, it will give the coach vital footage of his offense and defense—and at the same time cut the cost of film in half.

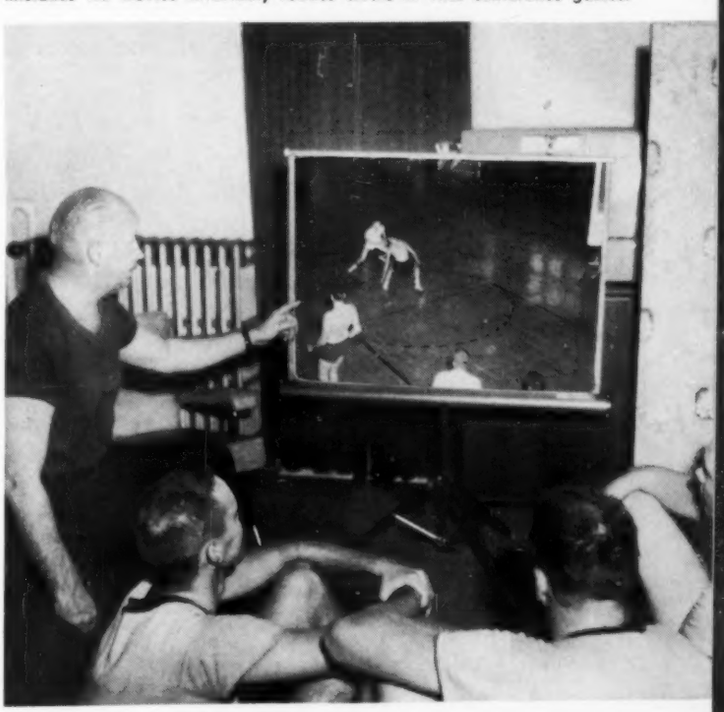
As with football coaching and game-analysis movies, rapid processing of basketball films is also desirable. Commercial film laboratories usually do not work Saturday nights, as they often do during the football season in order to accommodate the need of gridiron coaches; but most labs will provide "same-day" service during the week. Film placed in their hands during early morning hours or before noon usually can be processed and returned by Special Delivery mail the following day.

Basketball Filming Techniques

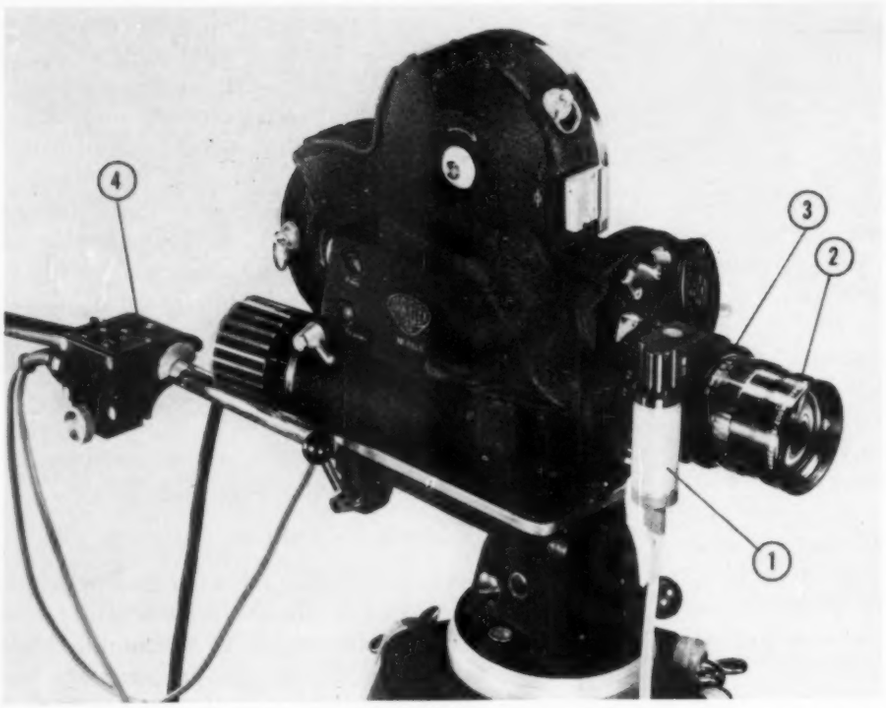
When filming basketball action for analytical purposes, the cameraman should concentrate on the players of the team for which he is shooting, shooting the team offense as the players near the midcourt line, then cover them as they move back on

Continued on Page 764

HEAD COACH Don Kennedy of St. Peters College in Jersey City, N.J., points out flaws in team play to members of his squad as movies of earlier practice session are projected. Graphic presentation of player mistakes via movies invariably reduce errors in vital conference games.



PRODUCT REPORT



FINGERTIP CONTROLS mounted on panhead handle enable cameraman to operate zoom lens in or out from the normal and more convenient position behind the camera. Speed of zoom can also be varied.

Motor-driven Zoom Lens

Pushbuttons mounted on panhead handle afford convenient control of the zooming action

By JOHN FORBES

A MOTOR-DRIVEN zoom lens is something many motion picture cameramen will find advantageous—especially those associated with industrial and technical film production. Such a lens is now reality — the product of the combined technical genius of Angenieux, the French Optical works, and Arnold & Richter, West German manufacturers of Arriflex cameras. Angenieux has provided the zoom lens and Arnold & Richter the motor-driven control unit that makes it zoom in or out at the touch of a button. The two units are pictured in the accompanying illustration, mounted on an Arriflex 16 camera.

The Model 70 Angenieux zoom lens, which Arriflex Corporation of America is marketing as one of several items of companion equipment for Arriflex cameras, has a zoom range from 17mm to 70mm. The conventional model is equipped with the usual hand-lever zoom control. The motor drive and control unit added to the lens, converts it to automatic operation.

The lens control unit consists of a miniature electric motor and gear mechanism (1) which is mounted directly on the zoom lens barrel (2) by means of a special split-ring clamp (3). The control unit is mounted directly back of the camera on the panhead handle, as illustrated (4), affording the cameraman finger-tip convenience of zoom operation that results in smooth, readily duplicated zooms.

Zoom Speed Variable

Two buttons on top of the control unit activate the zoom lens action—one for zooming out and the other for zooming in. A third control permits varying the velocity or speed of the zoom. This is done by means of a dry-run, determining the desired speed, then setting the control for that speed. Zooming speed cannot be altered during the interval of zooming.

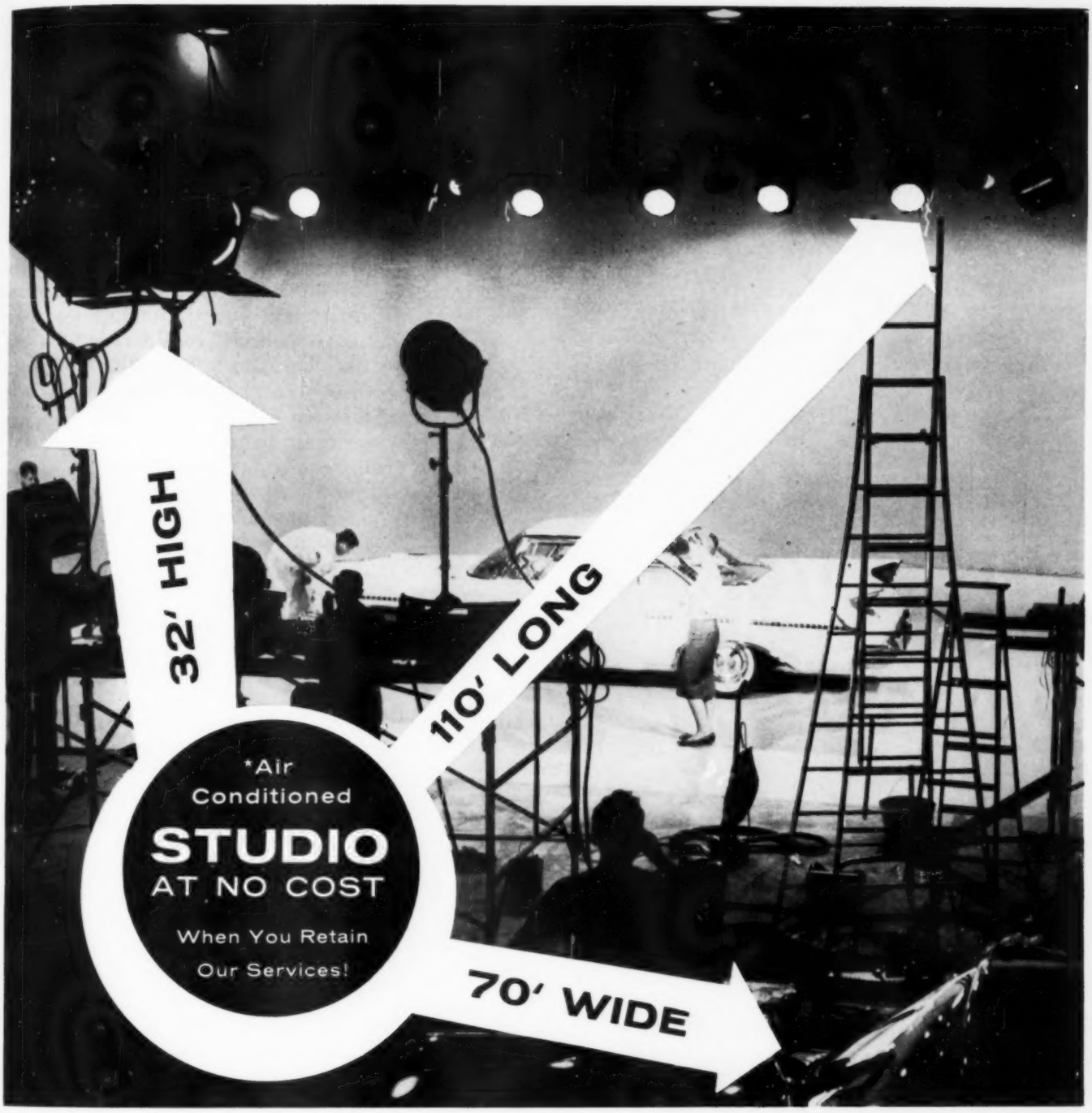
The miniature drive motor operates from the same 8-volt D.C. battery pack as the camera motor.

The motor-driven zoom combination is ideally suited for use with Arriflex cameras, which afford direct through-the-lens focusing and viewfinding by means of the camera's reflex shutter system that permits viewing the scene continuously as it is being photographed. It permits, also, the "dry-run" technique previously mentioned for establishing the rate of zooming speed.

Helpful in Industrial Filming

Engineers in industry and technical research and the motion picture cameraman working with them in the production of analytical, report, and factual films related to their work will recognize the advantages inherent in a motor-driven zoom lens control which enables the cameraman to concentrate his attention entirely on the subject matter seen through the camera finder, operating the zoom lens simultaneously with panning action, or with the camera in static set-up by means of the conveniently-located finger-tip controls.

Considering the prices that have been asked over the years for various lever-controlled zoom-type lenses, cost of the motor-driven zoom combination described above seems attractive: The Model 70 Angenieux zoom lens sells for $399.00. The motor drive is $249.50—$648.50 for the complete outfit. According to Arriflex Corporation of America, there is a nominal installation charge for mounting the motor-drive when the units are purchased separately. ■



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A GROWING TREND in producing video programs and commercials—especially where budget and production time are limited—is to utilize both video tape and motion pictures, then integrate the two in the production of the ultimate programming medium—video tape or film. How this formula was employed recently in producing a TV commercial in record time was described in an article in our September issue. In the article that follows, Allen E. Hall describes how the formula made possible the production, within a limited time and budget, of "The New Indiana," a special 30-minute public affairs program for WLW-I, Indianapolis, Indiana. —EDITOR.

INTEGRATING VIDEO TAPE AND FILM

Each medium holds certain advantages for producers of video programs and commercials, thanks to recent developments in tape-to-film and film-to-tape transfer techniques.

By ALLEN E. HALL
Producer-Director, WLW-I, Indianapolis, Indiana

ONE OF THE MANY decisions a television producer must take these days is whether to do a contemplated show "live" or put it on film. When time and budget are limited, the usual procedure is to employ live television technique. Where the show must be accurate down to the last letter and cover a broad scope, film is the only answer.

At WLW-I recently I was assigned to produce and direct "The New Indiana," a special show which was to dramatize the many improvements throughout the state of Indiana during the past four years. The time alloted for producing the half-hour program feature was thirty days and the budget less than $5,000. Because of political considerations in this election year, the show had to be factually perfect; and since the show was scheduled to be telecast over a network of eighteen stations in Indiana, Ohio, and Kentucky, there could be no production slip-ups.

Under ordinary circumstances a project of this nature would be filmed. But the time allotted and the limited budget precluded that. Television being what it is, live production could not guarantee letter-perfect facts or production, nor could it handle the vast state-wide scope of the material. That requires film. In order to resolve this paradox WLW-I decided to try a production technique which promises a new and boundless programming tool for local television stations. Briefly, this technique consists of utilizing video tape records of live television pickups made at the studio, and film shot on various locations throughout the state, then integrating the two mediums electronically on video tape. A notable advantage of this method is that it permits making all necessary special effects electronically during video-taping by means of the station's RCA TS-40 switcher — effects such as fades, dissolves, wipes, matting, etc. — with the consequent saving of considerable production time that otherwise would be required were such effects done on film by a laboratory.

With this decision made, production of "The New Indiana" was scehduled as follows:

Aug. 16: Rough script received; shooting begun.
25: Final script completed. Conference for treatment and art work.
Sept. 1: Music selected; editing begun. "Live" production set for after sign-off of station on Sept. 9th, with a similar time on Sept. 11th reserved in case required.
5: Music editing completed; film editing begun.
9: Filming completed and editing of same subsequently completed. Additions made to music track. Narrator assigned by ad agency. Final revisions made on script okayed.
10: Studio production from 1:00 to 6:00 A.M. Additional filming from 9:00

P.M. 'til midnight.

Sept. 11: Sound track recorded; additional editing of film.

13: 1:00 A.M. to 5:00 A.M., production concluded. Sound track re-recorded on video tape at noon, previewed for client at 5:00 P.M.

15: Show telecast on 18-station network.

The motion picture footage produced in this schedule was edited by program segments into modified A & B rolls for playback on the station's two RCA film-chain projectors. Each segment was edited to match the script or the music, with extra footage allowed at the beginning and end of each segment to permit leeway in making transitions. Thus the term "modified" is used above in describing the A & B roll procedure; instead of full-length leaders inserted between segments, as is usual practice, we left only enough frames to permit "stopping down" the projector between scenes. Cue-marks placed on the film indicated when projector was to be restarted as a new scene approached. For scenes with quick transitions, a pre-A & B roll was made with both projectors operating without a stop. Where live insertions were to be made, both projectors were stopped for the required interval.

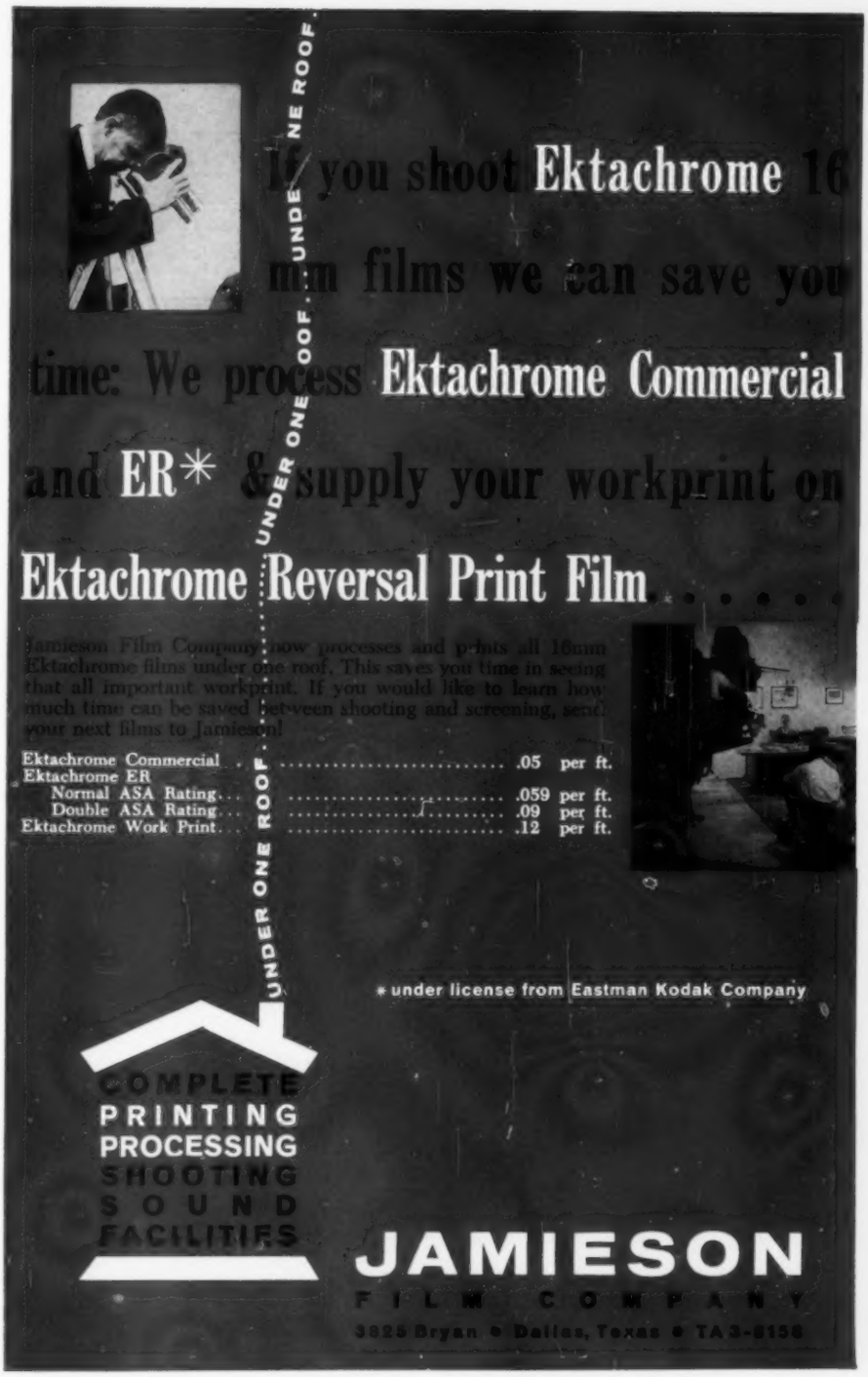
First Video Taping Session

The first video taping session was scheduled for after station sign-off Friday, September 9th. We had five hours in which to rehearse and tape the show. Because it had not been possible to test-run and check any of this taping, difficulty was encountered in this first production attempt. The primary problem was with the audio. The plan had been to pre-record the sound track then match the video to it. But this couldn't be done because of the late assignment of the narrator and then the unavailability of station facilities.

During production there was great difficulty integrating the many music and narration cues with the video. If there had been more time available for rehearsal the job could have been done. So after two attempts we decided to take another tack.

Saturday evening we shot on film several of the live segments that previously had given us trouble when taping. And after sign-off we sync-recorded the audio on sprocket driven magnetic film.

Sunday and Monday we re-edited the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film to match the sound track, making a master A roll which would roll at the start of the sound track and be a constant reference through the whole show. We then edited the B roll to contain all the film that was to be electronically combined with the A roll. This B roll had only enough leader between each segment for projector stop-down, as previously described.

The second production effort was Monday night, September 12th, after station sign-off. There were several false starts in getting the video matched with the audio. But the third try was a success. We had a perfect take up to the last minute, when we encountered a film problem. This took just a couple of minutes to correct and after four more starts we got the show on tape. This second effort was very simple, the easiest possible type of production.

The station is so interested in the possibilities of this method of program production that it is planning to utilize it in doing a series of documentaries this year.

Lessons Learned

The first effort with this method taught us several things:

1: It's versatility is almost unlimited. Just as in live television, script revisions can be made right up to production time. They can even be made after the production has been completed. For example, we were not satisfied with the quality of the audio track on the video tape. So we re-recorded our original track on to the video tape with perfect sync and much improved match in qualities.

2: We are able to closely follow film production methods, such as pre-recording the sound and editing the film to it.

3: We learned not to make too many rapid video switches. If the production must be made in one continuous effort, as ours did, the simpler the better. However, if the station is equipped to splice video tape, the production can be as intricate as need be since the show can be taped in segments then spliced together. I feel we could have done "The New Indiana" the first try if we had been equipped to splice tape.

4: It is advisable to record the audio track with a sprocket-driven magnetic film recorder, which facilitates editing the film and guarantees continuous sync.

A & B Rolls

We found it advisable to edit all film into A & B rolls, then to roll these simultaneously and in sync. We let the A and B rolls run continuously during the production taping session, thus avoiding the necessity for cues. In such a procedure, if the projectors are off sync, then it is advisable to edit the film with the bulk on the A master roll, and the remaining segments on the B roll, with a stop-down leader inserted between each segment.

To summarize, we believe this is a method of television production that enables local independent stations having a video tape set-up to produce shows of top-notch quality—comparable to that turned out by network stations working with major film laboratories. Most stations already have the necessary equipment. All they need do is spend some time experimenting. Ultimately, the method should materially increase station programming and revenue. ■

IS THERE A FUTURE IN FREE-LANCING?

Continued from Page 742

spent his savings of $200 for a meager supply of 16mm Kodachrome film. Then he set out to shoot the little events along with the big.

Four days later Universal-International belatedly decided to release a short subject on the beauty pageant. They had good movie coverage of the final phase of the contest, but nothing whatever on the important preliminary events. Someone told them about See shooting these events in 16mm color. They tracked him down—had him come to the studio one night at 12:30 a.m. and screen his films — and subsequently purchased See's entire footage, which was blown up to 35mm for the company's Technicolor release, *The Most Beautiful Girls In The World*. Several years later the same studio bought his subsequent footage of the Miss Universe event for a second film, *Beauty Queens*.

See makes his still photography an important adjunct to his movie work. (He owns and uses a battery of fourteen different cameras!) His pictures have appeared on the cover of Life magazine's Spanish edition and many times within its pages. His camera work has graced the covers of dozens of other Latin-American publications.

See has tapped a market which many other American photographers have failed to exploit—foreign sales. Many South American governments and business firms regularly send for Charlie See when they have an important photographic assignment — even though there may be competent photographers available locally.

Being a free-lance photographer, Charlie See has to sell himself and his abilities at all times. Part of his secret in getting assignments lies in showing his movies and stills at every opportunity.

In Brazil See obtained an assignment to film the Miss Brazil beauty contest for the local Associated Newspapers. Later, after screening his films, the Willys-Overland company of that country engaged him to photograph its big Jeep plant in Sao Paulo.

Subsequently he took his cameras over some of the most rugged terrain he has ever traveled. The Brazilians wanted motion pictures of their Jeep being used under the roughest possible conditions. See got it for them, but at the expense of considerable personal discomfort.

Near-disaster Encountered

Two years ago he traveled to Surinam (formerly Dutch Guiana) to make a film for a government agency. He traveled inland almost to the tributaries of the Amazon river to photograph the local natives and the country. Before he left Surinam months later, he produced two additional pictures, one for the government and another for a local firm. The rugged trip on the Marrowyne river in Surinam almost threatened to end his photographic career—for a time, at least. Half way on the journey a canoe swamped, dumping his equipment into the river. Immediately, natives dove down to retrieve what they could. After a thorough drying of the equipment over a hastily-kindled fire and a careful cleaning, the cameras functioned perfectly again. Luckily, the water had not penetrated inside the lenses.

See has gotten into more difficulty, perhaps, in large cities than in the remote jungles. In the capital of the Dominican Republic one day he noticed several beautiful tropical flowers blooming inside a large gate. He set up his cameras and took long shots of the blossoms and then moved in for close-ups.

Suddenly, he looked up into the muzzles of four guns. He had unwit-

tingly walked into the grounds of one of the palaces of Dictator Trujillo. Things looked black for a few minutes, but See was able to produce credentials which got him out of the sticky situation.

See was in the Dominican Republic on an official assignment, but as usual he had taken time out to make movies for his own files. He was under contract to film the 35 million dollar International Fair which then was in progress. The government had flown almost his entire laboratory to Ciudad Trujillo to facilitate his work.

One Assignment Leads To Another

In characteristic fashion See had left Hollywood headquarters "loaded for bear." He expected to be gone only five months, but he had brought more than enough equipment and supplies "just in case." He ended by staying nearly a year. After completing the government project, he made a documentary film on the local road building activities of a construction company.

As described above, many of See's assignments have had a snow-balling effect, one bringing on another. While he was in Mexico on an assignment for the government, a Guatemalan consul saw some of his work and signed him to photograph a film of Guatemala.

After completing this assignment, See previewed his picture for then President Castillo Armas.

When See is not shooting pictures in some hot, tropical locale, invariably he will be found working in the opposite extreme — some frigid area of the world. While in South America, an assignment took him to the heights of the Chilean Andes where he worked with difficulty in below-zero temperatures.

Charlie See usually shoots on speculation when he is not working under contract. When Queen Wilhelmina of the Netherlands toured the United States recently, he recorded the high-points of her visit in California on 16mm color film. This investment in time and film he retrieved later by screening the films before Dutch groups in the Los Angeles area.

Later, during a visit to Europe, he personally handed a print of the film to the queen at Tjoesdyk Palace. She kept the picture for six months and then returned it along with a warm letter, commending him for his efforts. As a result, he likely will have no problems when he returns to Holland on future assignments.

Charlie See's toughest assignment, he

A negative approach . . .

figures, was one which took place almost in his own backyard. He was to photograph Canadian swimming star Winnie Roach in her attempt to swim from Catalina Island to the mainland of California.

Whether Miss Roach succeeded or failed, Charlie had committments to supply pictures for the newsreels and wire services. There was much interest in the event, because she had recently completed an English Channel swim.

The Catalina Channel attempt was postponed several times, because of inclement weather. But finally Miss Roach tackled it. After several hours in the water, the waves rose so high that the swimmer often was out of sight of See's cameras. Eventually Miss Roach failed, but See got his pictures in spite of the fact he was violently seasick most of the time.

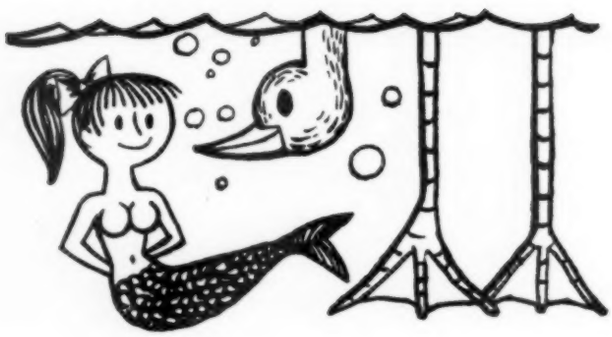
Whether he is in Europe, the Orient or the Americas, Charlie See always "overshoots" both movies and stills. Of course, he may not sell all his material immediately, but he is patient. He has a file of 50,000 still pictures and a vault filled with 100,000 feet of 16mm color film. Recently he started building a stock shot library of 35mm Eastman color film. Sales from his vast collection have paid big dividends.

Because of his multiple activities, See travels loaded with equipment. In addition to numerous still cameras, he carries two Bell & Howell 16mm Filmos and a 35mm Eyemo. Films for these cameras fill another weighty pack.

Before turning to photography, Charlie See led a varied career. Prior to coming to the United States from his native Singapore, he was an advertising man and later an amusement park manager. In the United States he tourned for six years as a professional dancer. Ultimately he landed in Hollywood and decided to become a photographer. After several years he accomplished his purpose with no formal training in the subject.

See expresses his formula for success in this way: "You have got to explore all phases of your field and be undaunted in your efforts, if you want to make money as a free-lance photographer."

Undaunted, See hopes next to make a trip to Russia to display his still pictures and show his 16mm color film, *Hollywood Without Makeup*. Even if he does not talk the Russian government into an assignment, he undoubtedly will come back with enough new pictures to make the trip worthwhile. ■



sometimes opens new horizons

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Continued from Page 735

function of the composition of the scene and which had to be balanced out by continuous manipulation of "shading" controls. The iconoscope is now nearly obsolete, having been replaced almost entirely by the *vidicon*, which has an excellent gray scale characteristic free of spurious signals and does not require continuous operation of the shading controls. Another television film camera, the *flying spot scanner*, also has very good characteristics and, like the vidicon, is used in color television film cameras, as well as in black-and-white cameras.

The television system can utilize only a limited range of densities from film, and the television film camera operator must adjust "gain" and "pedestal" controls (equivalent to "contrast" and "brightness") to fit a given film into the usable range of the television system. While observing the program signal on a picture monitor and a waveform monitor (oscilloscope), the operator sets the maximum highlight and shadow of the film to the voltage limits of the system. In order to insure proper reproduction of the film grey scale, the cinematographer should therefore attempt to include in every scene objects which serve as "reference white" and "reference black" for the video operator. These represent the brightest useful white and the darkest useful shadow the photographer intends to record. Their area need not be over one tenth the total frame area, and their brightness ratio, representing the maximum useful brightness range on the stage, should be about 20-to-1.

Dimensional and Scanning Characteristics

The limited resolution capabilities of the television system and the characteristically small viewing angles require that closeups and medium shots be used as much as possible, and that wide-angle and long shots be used mainly to establish perspective or to carry essential wide-range action. Television receivers are all "over-scanned" to some degree; that is, some of the picture is lost beyond the top and bottom and sides of the picture tube mask. Obviously, essential action and title information should be kept inside areas which will be seen on a majority of receivers. Practical experience has re-

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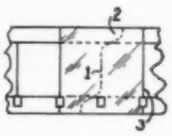

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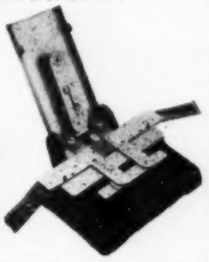

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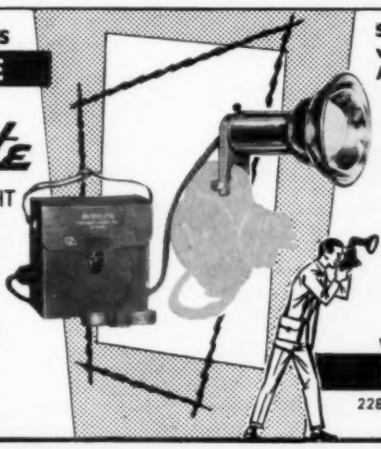

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sulted in the specification of a recommended "safe action area" and a "safe title area." These areas should be marked on camera ground glasses and viewfinders as a guide to the camera operator. Review room projectors also should be provided with apertures cut to these dimensions.

Lighting, Costume and Set Materials

The ratio of key to fill light should be a maximum of 2½-to-1, and the maximum brightness ratio of scene elements, as read by a spot brightness meter, should be 20-to-1 or not over 30-to-1.

Within a given lighting condition, brightness of scene elements must be controlled by proper choice of costume and set materials. High reflectance whites, such as white shirts or white walls, should be toned down by dyeing, painting, or by adjusting the lighting, so that they do not become an improperly high "white reference." Black costume and set decoration materials should be avoided as they will lose detail. Care should be taken to keep good lighting separation between dark elements of the scene, such as between an actor in a dark suit and a dark background.

Wherever possible, include a "white reference" and "black reference" in each scene as a guide to the video operator in establishing proper transmission levels. As a practical matter, this means that there should always be something in the scene lighter than the face, and something darker than the face.

Avoid large areas of white or black in the picture in order to maintain acceptable grey scale reproduction on those receivers without d.c. restoration. As a guide, those scenes for which a reflected light exposure meter would give an exposure indication equal or close to that of an incident light meter, should reproduce satisfactorily. Night effects should be simulated by suggestion (lighted window, street lamp, apparent single source of light) rather than by shooting almost fully dark scenes or by printing down ("day for night").

Large areas of uniform density should be avoided, particularly if they are very light or very dark.

Cutting back and forth between angles where the background is alternately light and dark should be avoided. Alternate camera angles should have similar background brightness.

All the recommendations for reference white and black, large areas of uniform density, d.c. restoration receivers, etc., apply to art work and animation as well as to "live" photography. Art work lettering should be controlled to produce print densities within the highlight and shadow range shown in laboratory practices. Large neutral backgrounds are best broken up with "cookies" or given an otherwise textured effect, and should be kept in a range which produces print densities between 0.70 and 1.0.

Whenever possible, review films on a closed circuit television system which includes a monitor *without* d.c. restoration. Review under such conditions is the best way to correlate stage photographic procedures, laboratory review room viewing, and the image seen by the television audience.

Laboratory Practices

Television film negatives should be correctly exposed and should be developed to a normal lb gamma of 0.65 to 0.70.

Prints are made on release print stock and are processed by a print-through gamma of 1.85 to 2.35, depending on negative photographic contrast.

Prints should be timed to produce a minimum density of 0.40 or higher in any area required to reproduce detail. Face densities or middle grey points of interest should be at a density of 0.75 ±0.15. Maximum density of any area required to reproduce detail should be 2.0 or lower.

Scene-to-scene balance of densities should be as uniform as possible.

Prints intended for telecasting will appear somewhat higher in density in the highlight areas and lower in contrast than prints made for theatrical release.

The print resulting from the above laboratory and photographic practices will have densities which fall within the usable range of the television system, and will have good shadow and highlight contrast needed to maintain an appearance of sharpness and clarity under the usually unfavorable home viewing conditions.

(The foregoing recommendations are covered in greater detail in the publication, "Laboratory Practices on Films for Television" available from the Association of Cinema Laboratories, 1905 Fairview Ave. NE, Washington, D.C.; also reprinted in the SMPTE Journal, January 1958, Vol. 67.)

Composition and Safe Action Area

Closeup and medium shots should be used as much as possible. Long shots should be used only to establish perspective or to cover wide range action.

Fine patterns or "fussy" material in costumes or set decoration will not reproduce in detail and can be distracting. Bold, simple patterns are much more effective. Closely-spaced parallel horizontal lines in costumes or sets can cause disturbing moire effects (interference patterns) with the television scanning lines. Long straight lines on large circles may not be reproduced correctly as straight lines or circles, due to receiver scanning distortions.

Essential action should be kept within the "safe action area." Essential title informtion should be kept within the "safe title area." It is recommended that these areas be marked on the camera ground glass and viewfinder.

Color Films for Television

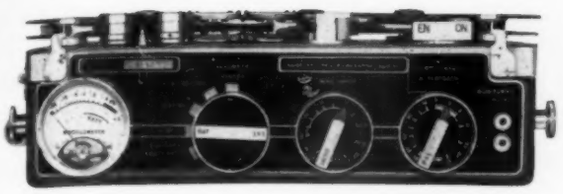
Most of the preceding recommendations for black-and-white television films apply equally to color television films. The limited latitude of color film, plus the fact there is no provision for contrast control in processing, make necessary even more carefully controlled lighting and exposure. Lighting ratios should be held to 1½-to-1 or a maximum of 2-to-1.

Whites and blacks in costume and set materials should be carefully controlled to a 20-to-1 brightness ratio. "Reference white" and "reference black" are necessary in color photography for TV as well as in black-and-white.

Even though color receivers have d.c. restoration circuits, the usual precautions against high-key and low-key scenes should be followed, since a great majority of receivers tuned to a color broadcast will be black-and-white receivers without d.c. restoration.

Make-up should enhance the natural highlighting and color differences in the face. Excessive flatness of makeup is neither necessary nor desirable.

In addition to the precaution against closely spaced horizontal lines, which



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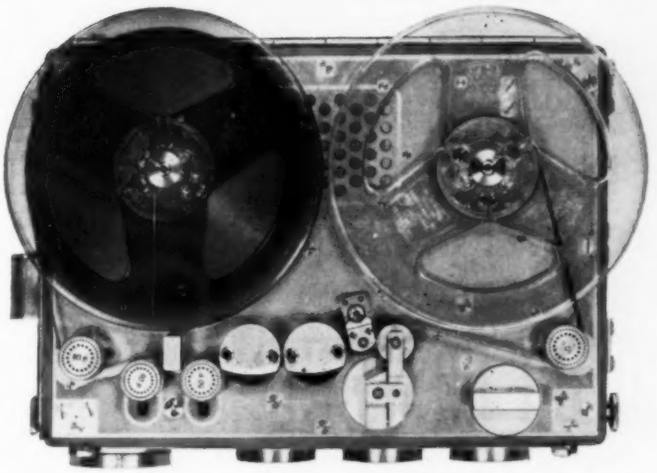

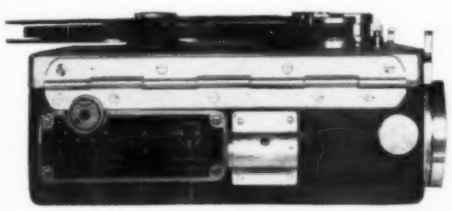

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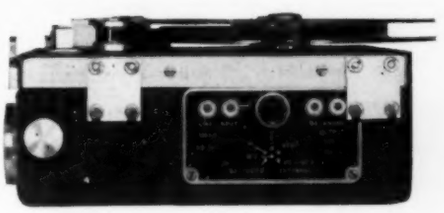

cause moire effects with the television scanning lines, color television photography should avoid closely spaced, high contrast vertical lines, which can cause an interference with receiver color circuits to produce a disturbing "color moire effect."

When tuned to a color broadcast, a black-and-white receiver displays a panchromatic version of the color image, not a "green separation" as sometimes supposed. The panchromatic balance is not exactly equivalent to that in panchromatic black-and-white film, as in color television, green contributes most to black-and-white receiver brightness (59%), red somewhat less (30%), and blue least (11%). These values can be a guide to the equivalent brightness difference of set materials or costumes when seen on black-and-white receivers.

In the contrary situation, a color film will project satisfactorily on a black-and-white television system, since the vidicon, which is now in general use, has a panchromatic sensitivity sufficiently broad for this purpose.

Negative-positive type color films are more satisfactory than reversal films for color television, since reversal duplicates from reversal originals are

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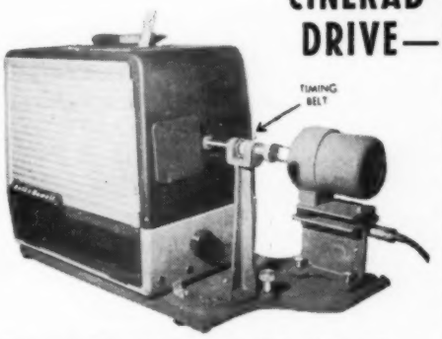

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generally of too high contrast for good television reproduction. Original reversal color films usually will reproduce satisfactorily.

Color prints should be balanced for arc projection as color receivers are adjusted to a white color temperature of 6500 degrees Kelvin. Prints should be carefully color balanced from scene to scene, and "whites" or "greys" in highlights or shadows should be neutral in color. Prints should be timed dark enough to reproduce good color saturation, with grey scale density values being about the same as those given for the best results in black-and-white.

A & B printing from color negatives is recommended for making dissolves and fades, thus avoiding the use of intercut second generation material. Black-and-white prints from color negatives should be made from a panchromatic master positive and duplicate negative. The black-and-white print from the duplicate negative should be made to the specifications for black-and-white television prints outlined previously. ■

AN INFRARED SELF-MATTING PROCESS

Continued from Page 741

this velour with sheet aluminum we more than doubled its reflection of infrared rays. This, of course, is quite logical since infrared rays are heat waves and bounce back from aluminum foil or any other polished metal.

The best infrared "light" source for our spectrum range, we have found through trial and error, is the conventional incandescent lamp. There are many other sources of infrared waves, but unfortunately most of them are above 900 mμ, and hence beyond the infrared film sensitivity and impractical for our purposes.

The two curves in Fig. 2 explain the core of the process in a graphic way. The solid line represents the sensitivity of the infrared film, which is seen to be most sensitive in the areas between 700 and 900 mμ. The broken line is the transmission curve of the dichroic filter coating for foreground lighting, and as we see, it cuts off very sharply just within the 700 mμ region where it is needed most, while the visible transmission is hardly affected.

Thus the black background is prepared and "illuminated" with infrared rays in such a manner as to give a good exposure on the infrared film stock but negligible exposure on the visual film stock.

Foreground Lighting

Concerning the visual side of the process, it is necessary to expose the panchromatic film stock but at the same time avoid exposing the infrared stock with any of the foreground action. Therefore the infrared portion of the spectrum must be prevented from hitting the foreground action because if it should, we would get an exposure of the foreground action on the infrared stock.

It is possible today, with improvement of techniques in the field of dichroic coatings, to prepare a coating which to a high degree will cut out any desired part of the spectrum. In our case we were trying to prevent a particular portion of the spectrum from lighting the foreground to which the infrared film stock is sensitive, namely 700 to 900 mμ.

Special dichroic coatings were devised for the Fresnel lenses of our studio lights so that the infrared waves between 700 and 900 mμ are not allowed to pass through, while the remainder of the spectrum is practically undisturbed. Neither the eye nor the panchromatic film stock is affected because what we have eliminated was invisible anyway.

Thus we do not have infrared rays hitting the foreground, but we do have infrared rays hitting the background. To be more specific, the foreground is lit with light minus infrared rays and the background is lit with light plus infrared rays.

Combining of Elements

The next step is to record these two elements on two pieces of film. In order to have an exactly identical picture, it is essential that these two elements should be exposed through one lens. Figs. 3 and 4 show how the light passes through the camera lens and thence to the film:

(A) Light passes through the lens and to the film.

(B) If we insert a piece of glass between lens and film, the light still passes through just as before.

(C) If we coat this piece of glass

with the same kind of coating as used on the studio light Fresnel lenses, then the visible light will go through this piece of glass as before, but the infrared waves will bounce back.

(D) If we tilt this glass 45°, then the infrared waves will be bounced back at a 90° angle, and if we place the infrared film in their path we can then receive that exposure; and that is exactly what the split-beam camera does.

Of course instead of a piece of glass we use a prism because it is so much more effective. This is the principle in its pure form. We have one drive transporting both strips simultaneously and we photograph through one lens.

The Studio Process

Figure 1 indicates how the process is applied on the studio floor. We see that the background is illuminated with light *plus* infrared rays and the foreground, on the other hand, is illuminated with light *minus* infrared rays. Obviously the minus-infrared light can hit the background without doing any damage, but the plus-infrared light must not hit the foreground action.

In the beamsplitter camera, the light *plus* infrared rays and the light *minus* infrared rays both pass through the same lens but are split by the prism in such a way that the infrared information is received by the infrared film and the visual information by the visual film.

The eight steps in Fig. 1 show how the two records are combined:

(1) On the visual side a conventional modulated negative with a clear background is received because the background is black as far as the visual sensitivity is concerned.

(2) An opaque background with a clear silhouette is received on the infrared side because this film is sensitive only to the infrared background.

(3) This represents the negative of a background, although a fine-grain print would do as well.

(4) A positive matte is obtained by making a high-contrast print of the infrared negative matte.

(5) A fine-grain print of the background is made.

(6) A fine-grain print of the visual negative gives an opaque background.

(7) A print of (5) on a negative stock is made by bi-packing (4); if developed, it would give us something like a hole in the negative. But we do not develop this piece of film until we print (6) onto it in register.

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(8) We then develop it and obtain a composite negative.

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We can readily see that this process is fast and economical. It does not require a large studio space; in fact, we have shot this process quite frequently in a space not larger than 20 by 30 ft.

It is not imperative to have the plate shot before the foreground is photographed.

It is quite simple to change the background while there is no cut in the foreground.

The optical work of compositing is straightforward and routine. In fact, frequently we are able to combine the two elements on a pilot pin registration step printer.

This matte process allows us to keep the foreground and background in absolute focus if so required.

Timing Problem

Mention should be made of the problem of timing foreground action to background action which sometimes is necessary and is very simple with this process. We could readily synchronize a 16mm projector with the camera (just as it is necessary to synchronize the rear-screen projector with the taking camera, if the rear-screen projection process is used) and make a simple 16mm print of the plate. The actors, instead of watching the screen behind them, could watch a small screen in any strategic position.

We have made double and triple mattes with great success and are finding new and simplified ways of using the process every day. ■

FEINDEL'S PHOTOGRAPHY

Continued from Page 736

rector Irving Lerner in pre-planning, cinematographer Feindel set out to create a style of photography that was determinedly different—not "Art For the Sake of Art," but Art for the sake of advancing the story. Without such camera treatment, "Studs Lonigan," with its loosely knit screen narrative that never arrives at any definite conclusion, might well have been uninteresting screen fare, despite competent acting and direction. It can truthfully be said that it is the photography that saves this film from such a fate.

The entire picture (with the exception of a few sequences filmed at Santa Monica Beach and Griffith Park) was shot at the Hal Roach Studios, where the back lot offered street sets reminiscent of certain sections of Chicago as they appeared during the period of the story. These sets are used to advantage in the opening sequence showing Studs and his neighborhood cronies standing on a street corner, huddled around a fire of newspapers kindled in an oil drum, and scanning the wants ads in search of jobs. Slushy snow (provided by the Special Effects Dept.) covers the ground, while wind (courtesy of a wind machine) provides the gusts for which the city is noted. The sequence was shot on a dull day in flat light, and on the screen it looks for all the world like a typical cold dreary day in Chicago.

This same street set with its dingy brownstone fronts is used effectively from time to time throughout the film for both day and night sequences. It should be pointed out, however, that the scenes shot there (though expertly photographed) lack context—a fault that could have been avoided through the simple expedient of establishing these sequences with carefully selected stock shots of Chicago.

The somber intensity of Studs' brooding world is most effectively conveyed by Feindel's use of an unusually bold style of low-key lighting—bold because almost no fill light was used and because many scenes were shot with the principals' faces in silhouette or just slightly rimmed with cross-light. There is always the danger with this type of lighting that the audience, unable to see the players' faces, will be confused as to who is speaking. Such confusion was avoided in this film, however, because the camera effectively narrowed its field to the

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focal point of action, and preserved audience orientation by such devices as following a player from light into darkness. An especially expert example of this style of lighting occurs in a sequence showing Studs in his bedroom at night. His mother comes in and talks to him and then leaves, turning out the light. He is left momentarily in silhouette, his mood enigmatic until he turns toward the window and the "moonlight" illuminates his anguished face.

Throughout the film Studs' fears and the phantoms of dread which prevent his facing the world of reality are symbolized by looming shadows which seem to block his path, menacing him at every turn. Even while he and his cronies gather in a speakeasy, a locale ordinarily denoting gaiety, the shadows conspire in the background and seem to reach out, dooming certain of the group to destruction. At a corner table they spy a shopworn prostitute. They surround her and taunt her with macabre compliments about her beauty. There is a moment of horror in which she lifts her wretched face hopefully into the glaring light and beholds the visages of the decadent youths surrounding her, their faces thrown into

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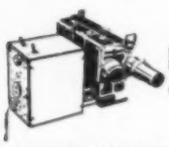

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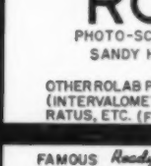

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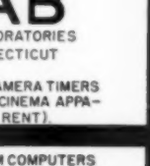

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The pool hall which functions as the hub of Studs' physical universe and symbolizes the frenzy of aimless activity which fills his life, is depicted as an oasis of light which emanates from a shaded lamp hung overhead. The figures on the periphery of this illuminated circle are shadowy, almost faceless—the whores and guttersnipes who people Studs' closely circumscribed world. The game of pool, as pictured in staccato, sharply angled closeups, is itself symbolic of an erratic life pattern: the momentary score, the frequent near-miss, the Freudian thrust toward identity. At one point the camera (through the facility of the zoom lens) follows a struck ball across the table and into a corner pocket. Constantly re-established in montage form, these pools room sequences depict the passage of time by their very sameness —the frantic running on the treadmill of life as the world passes the film's hero by.

Along the way Studs goes with his cronies to a burlesque show where, in a smoke-filled theater, a weary stripper becomes the Lady Eve—eternal Woman—to a crowd of lascivious spectators. This sequence is filmed in very low key with just a spotlight on the stripper. Reverse angles shot from the stage aim directly into this spotlight which shines from the gallery, rim-lighting the heads of the spectators, back-lighting the smoke and lending great depth to the composition. In order to stop down sufficiently to preserve depth of field in the sequence, Feindel switched from DuPont Superior 2 to the ultra-fast DuPont Superior 4 negative and he utilized a hand-held Eclair Camerette to take the audience right into the crowd.

Leaving the burlesque theater in a fine frenzy of sex and alcohol, Studs lurches through the rainy streets to the apartment of a former school teacher, portrayed as a thirtyish woman of severely restrained attractiveness who sublimates her sexual frustration in the form of a passion for recorded Beethoven. In his lust-clouded vision she alternates between her prim self and a provocatively jiggling personification of the stripper until finally, lunging toward her with seduction flashing from his eyes, he grabs her and tears her dress—a gesture intended to symbolize ravished virtue.

Photographically this sequence is a small masterpiece. It is, again, shot in extreme low-key, with the illumination seeming to come from a muted lamp. The angles are low, showing the ceiling of the room, and making the figure of Studs appear to loom as if to fill the apartment. The tricky device of repeatedly intercutting shots of the teacher with her burlesque alter ego is expertly accomplished. As the teacher, she is lighted to accentuate her plainness. As the stripper she is lighted to exude glamour—but the background of the room consistently remains in the same key throughout. Needless to say, figure size, angle and framing had to be very carefully matched to prevent jumps when cutting back and forth from one image to the other.

A wake following the death of one of Studs' sidekicks is also expertly handled camerawise. Here again, the hand-held Eclair camera is utilized, this time in a subjective way to simulate the point-of-view of a spectator pushing his way through the crowd, peering momentarily into the faces of various people present. In approaching this shot Director of Photography Feindel knew it would be catch-as-catch-can, so he let the camera run quite a long time. A surprising amount of the shot was usable, and its presence in the final cut gives an authentic impression of a spectator moving through the crowded smoke-filled room. It is in the wake sequence, also, that the camera captures in a mercilessly unvarnished closeup the face of the dead man's wife as she eulogizes in a lengthy monologue (perhaps the best piece of acting in the entire picture) the dubious virtues of her deceased spouse. Resisting an impulse to cut away for reaction, the camera remains on her in closeup for what seems like a full reel, delineating with almost newsreel brutality the sagging hopelessness of her young, suddenly-grown-old face.

Location exteriors in "Studs Lonigan" presented the usual share of problems. A rain sequence in the park necessitated the rigging of a maze of overhead water pipes, plus an intricate system of umbrellas and shields to protect the camera. A sequence supposedly taking place along a lonely stretch of Lake Michigan shore was, in reality, shot at Santa Monica Beach, with the Pacific Ocean doubling for the lake. Anyone familiar with Chicago knows that because of its peculiar geography, a sunset is never seen on the lake. Since this sequence was sched-

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uled to be shot toward the West in the late afternoon there was some apprehension as to whether a sunset might distort the authenticity of the scene. Fortunately it turned out to be an overcast day with just enough sunlight to highlight the scene without the intrusion of an actual sunset.

Aside from low-key lighting and unusual camera angles, Feindel utilized many other devices to create photographic mood. He used a combination of fog filters and fog machines to lend a swirling chill to night scenes in the Chicago streets. He filled a church interior set with suspended smoke in order to gain an impression of shafts of sunlight filtered through a haze of dust. He used low angles wherever possible to lend importance to the characters, and he filmed almost the entire picture with a 30mm wide-angle lens to accentuate the drama by means of exaggerated perspective. Here, the "fluid camera" technique is used so skillfully that camera movement is never obtrusive.

Arthur Feindel, a graduate of the New York Academy of Design and of the Art Students League, was a commercial artist for several years before becoming a cameraman. He does not regard himself a camera "artist"—but rather a commercial cameraman who slants his photography to the audience. His achievement in photographing "Studs Lonigan" is a refreshing study of black-and-white cinematographic artistry. ■

FILMING HOOKWORMS

Continued from Page 733

which held the worm in a vertical position, it was possible to film the extraordinary way in which the worm performs this feat (Fig. 5). The blood coming out of the worm looked like cigarette smoke projected out forcefully. Here it was very difficult to determine the exact moment when the worm would start to expel.

The Hookworm Speaks

When the film was in its final editing stage the Institute's scientists announced further progress in their investigations: *sound* signals had been obtained from the worm. Silver microelectrodes connected to the blood and saline solutions containers in which the worm had been introduced (Fig. 3), were connected to a special hi-gain amplifier and an oscilloscope. Signals corresponding to the electrical potential developed by the contraction of the worm's esophagus were then produced and could be observed on the oscilloscope screen. The same signals seen on this screen were then transformed into audible sound signals and heard on a loudspeaker.

It was decided to make this phase of our scientists' interesting investigation a part of our film. We recorded the sound signals generated by the hookworm with an Ampex ¼-inch tape recorder and then synchronized the sound track with the corresponding picture (Fig. 4).

Although in the beginning the shooting of this picture appeared to be simple, we encountered many unexpected problems. We had chosen electronic flash as a means of slating each take. This presented serious problems in the reproduction of the worm's sound. The electrical discharge from the flash produced an induction in the amplifier system. We were finally able to use the flash for slating after every part of it had been isolated. The sync mark produced by the flash resulted in a "blank" frame on the film and a "spark noise" on the sound track. By this method it was easy to synchronize the picture and the sound track in editing. The camera motor, the recorder, and other equipment also had to be isolated separately. After all the precautions had been taken we had another surprise during a take: transmission from a nearby amateur radio station was picked up by the electronic amplifier system and mixed with the worm signals!!! Then, when all the instruments, camera, recorder, etc., were ready to "roll," the worm would not suck, or vice versa.

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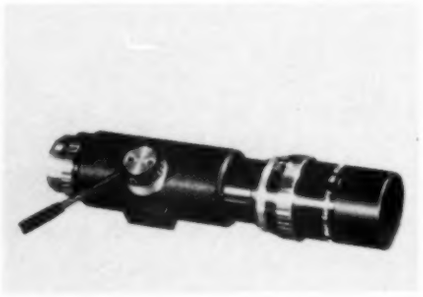

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JACK MACKENZIE, ASC, LIONEL LINDON, ASC, "General Electric Theatre"* (Revue Prods.).

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TWENTIETH CENTURY-FOX

ELLS CARTER, ASC, "The Fiercest Heart" (C'Scope & Deluxe Color) with Stuart Whitman and Juliet Prowse. George Sherman, producer-director.

FLOYD CROSBY, ASC, "The Little Shepherd of Kingdom Come" (C'Scope & Color) with Jimmie Rodgers and Luana Patten. Andrew V. McLaglen, director.

REPARTO OPERATORI, "It Happened in Athens" (API; C'Scope & Color; shooting in Greece) with Jayne Mansfield and Xenia Calogeropoubs. Andrew Marton, director.

PHILIP LATHROP, ASC, "Hong Kong"* with Rod Taylor and Lloyd Bochner.

LLOYD AHERN, ASC, "Adventures in Paradise"* with Gardner McKay and Weaver Levy.

SAM LEAVITT, ASC, "The Right Approach" (C'Scope) with Martha Hyer, Juliet Prowse and Frankie Vaughn. David Butler, director.

PIETRO PORTALUPI, ASC, "Francis of Assisi" (C'Scope & Color; Triton Pict. Corp.; shooting in Europe) with Brad Dillman and Stuart Whitman.

CHARLES CLARKE, ASC, "Madison Ave." (C'Scope) with Dana Andrews and Eleanor Parker. Bruce Humberstone, director.

WILLIAM MELLOR, ASC, "Wild in the Country" (C'Scope & Color; Co. of Artists Prod.) with Elvis Presley and Hope Lange. Philip Dunne, director.

KENNETH PEACH, ASC, "Sniper's Ridge" (C'Scope; API) with Jack Ging and Stanley Clements. John Bushelman, director.

LEO TOVER, ASC, "All Hands on Deck" (C'Scope) with Pat Boone and Barbara Eden. Norman Taurog, director.

KAY NORTON, "The Long Rope" (C'Scope; API) with Hugh Marlowe and Alan Hale. William Witney, director.

WARNER BROS. STUDIOS

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WALTER CASTLE, ASC, RALPH WOOLSEY, ASC, WILLARD VANDERVEER, "Maverick"* with James Garner.

HAROLD STINE, ASC, J. PEVERELL MARLEY, ASC, EDWIN DUPAR, ASC, ROBERT HOFFMAN, "Surfside 6"* with Troy Donahue and Diane McBaine.

EDWIN DUPAR, ASC, ROBERT HOFFMAN, FLOYD CROSBY, ASC, "Hawaiian Eye"* with Anthony Eisley.

WALTER CASTLE, ASC, "Sugarfoot"* with Will Hutchins.

BURT GLENNON, "Lawman" with John Russell.

J. PEVERELL MARLEY, ASC, RALPH WOOLSEY, ASC, ROBERT HOFFMAN, "Roaring Twenties"* with Rex Reason.

RALPH WOOLSEY, ASC, HAROLD STINE, ASC, ROBERT HOFFMAN, "77 Sunset Strip"* with Efrem Zimbalist, Jr.

THOMAS TUTWILER, ASC, Commercials*.

ARTHUR ARLING, ASC, Commercials*.

CLARK RAMSEY, ASC, Commercials* (Filmways).

COACHING BASKETBALL WITH MOVIES

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defense rather than concentrating the camera on the opponents as they move the ball up court.

In covering basketball action it is desirable to photograph the scoreboard even more often than when shooting football — during time-outs, on fouls, and at the quarter and at half time. Most gyms now are equipped with large electric scoreboards, making it easy for the cameraman to shoot a few frames at intervals that will indicate the score during progress of the game. Where such scoreboards are located some distance from the camera, I have found a 50mm Switar telephoto lens ideal for making such shots.

Where there is any question about the volume of light in a gym, its worthwhile to shoot 50 or 100 feet of film during a practice session to determine if the illumination is ample for acceptable motion picture photography. Sometimes adding a few spotlights or reflector floods in the corners of the gym will improve overall photographic results.

Earlier I related how certain college basketball coaches were using 16mm movies as a training and analysis medium. Many others, of course, have experienced gratifying results with movies of student games, which were

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Continued from Page 764

used to show the players how they looked in action as well as to point out where and how they could improve their game.

Honey Russell, of Seton Hall University, believes that visual aids are the most effective coaching media available to college coaches today. If a player, by means of movies, can actually see himself make the mistakes or the good plays pointed out to him by the coach, he's bound to be more impressed than having the same facts pointed out to him verbally, Russell says.

No other medium can show individual play so dramatically and impressively as movies, according to coach Cappy Capon of Princeton. Footwork on defense, the use of hands too quickly or the wrong hand defensively, offensive feints, the recognition of when to stop or keep going, recognizing when you had a shot or when you forced one, plus all the other technical phases of offense and defense are there on the screen for the player to see, Cappon points out.

Dayton University's coach Tom Blackburn has an average of six pictures of team play filmed each season, which subsequently are screened and re-screened in extensive study. "We use the films in analyzing other coaches' systems, to detect a player's weakness, to plan our strategy and in general to help our players to improve their playing skills. ■

NOTE: The foregoing article is based on an earlier article by the author, which appeared in the Vol. 10, No. 1 issue of the *Bolex Reporter*.—EDITOR.

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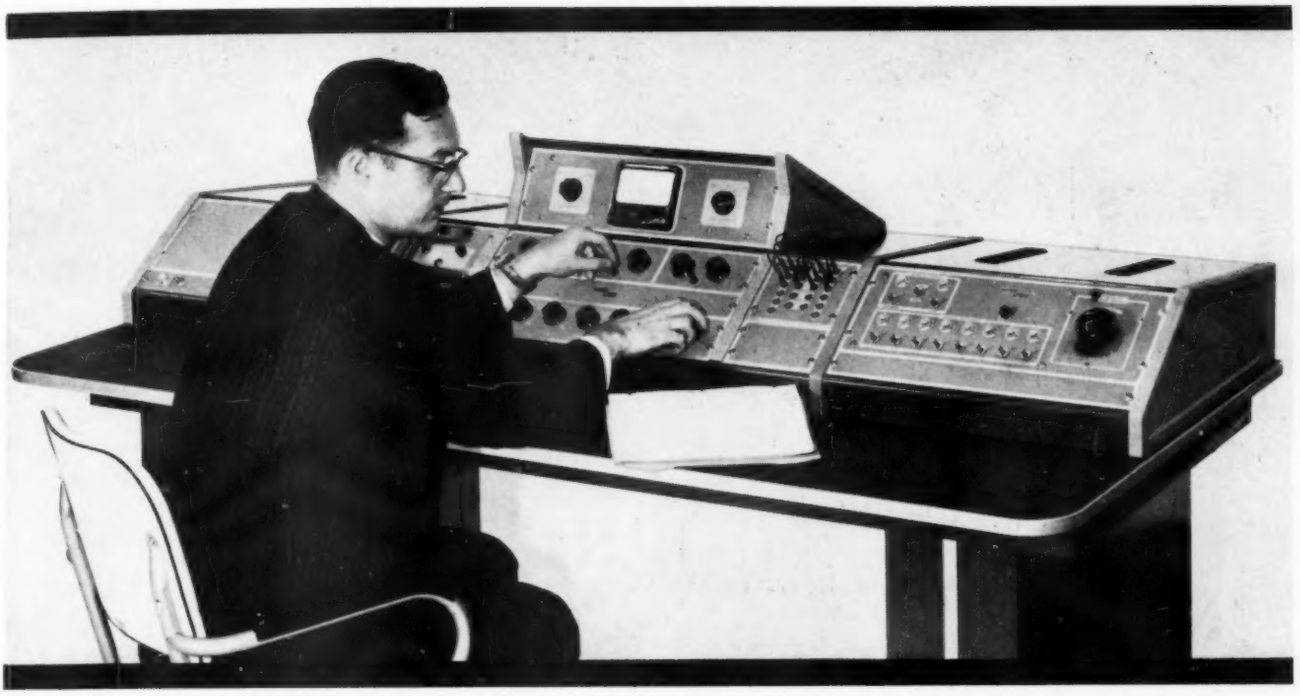

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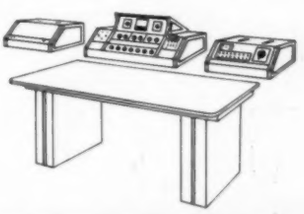

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